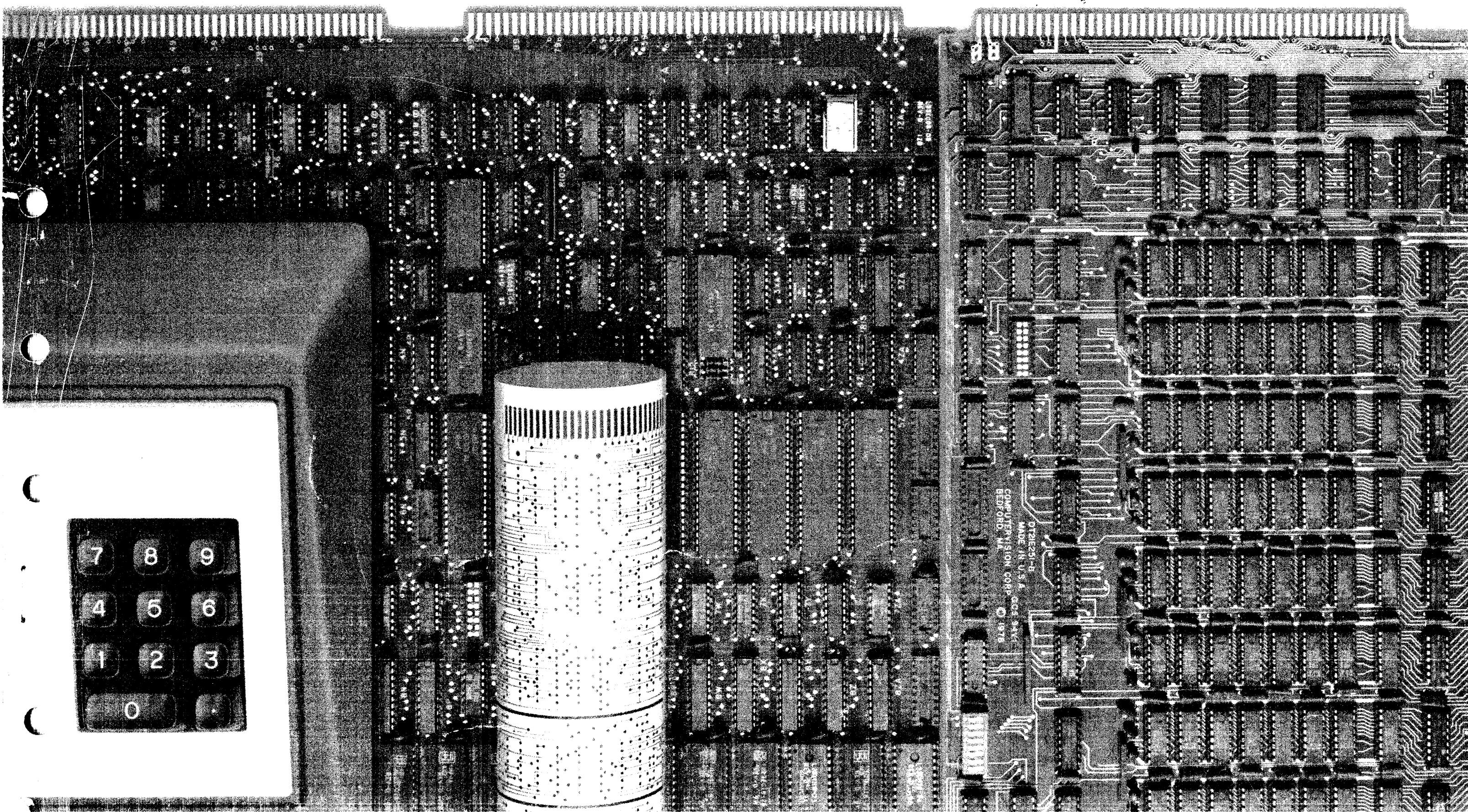


## Graphics Processing Unit (GPU)

Logic Diagrams



## **Graphics Processing Unit**

### Logic Diagrams

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DS23E017 (21 sheets)

*GPU Microprogram Flow Charts (Revision B)*

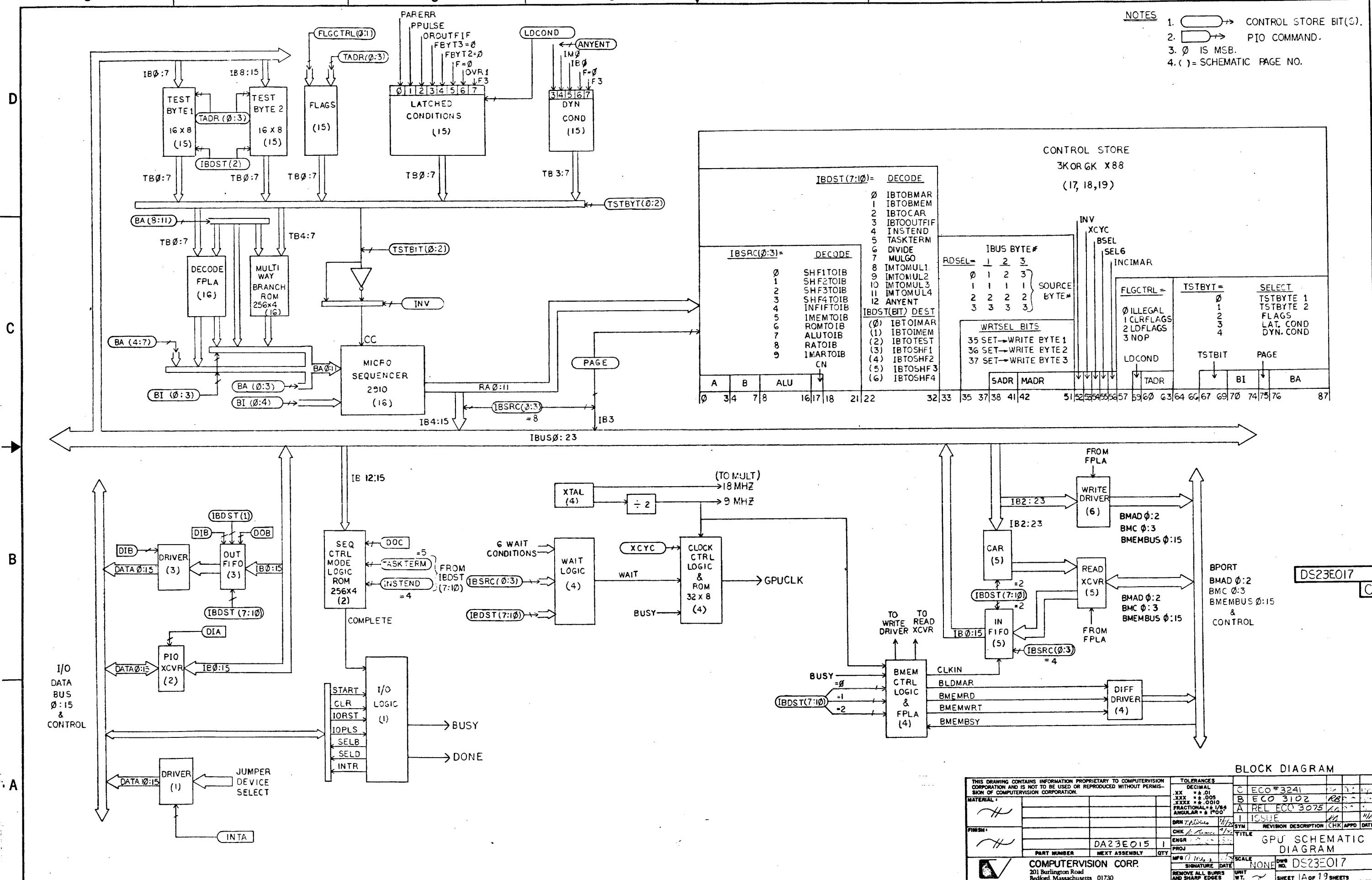
DS21E1065 (30 sheets)

## **Graphics Processing Unit**

### **Sheet No.**

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Output FIFO	3
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8 7 6 5 4 3 2 1

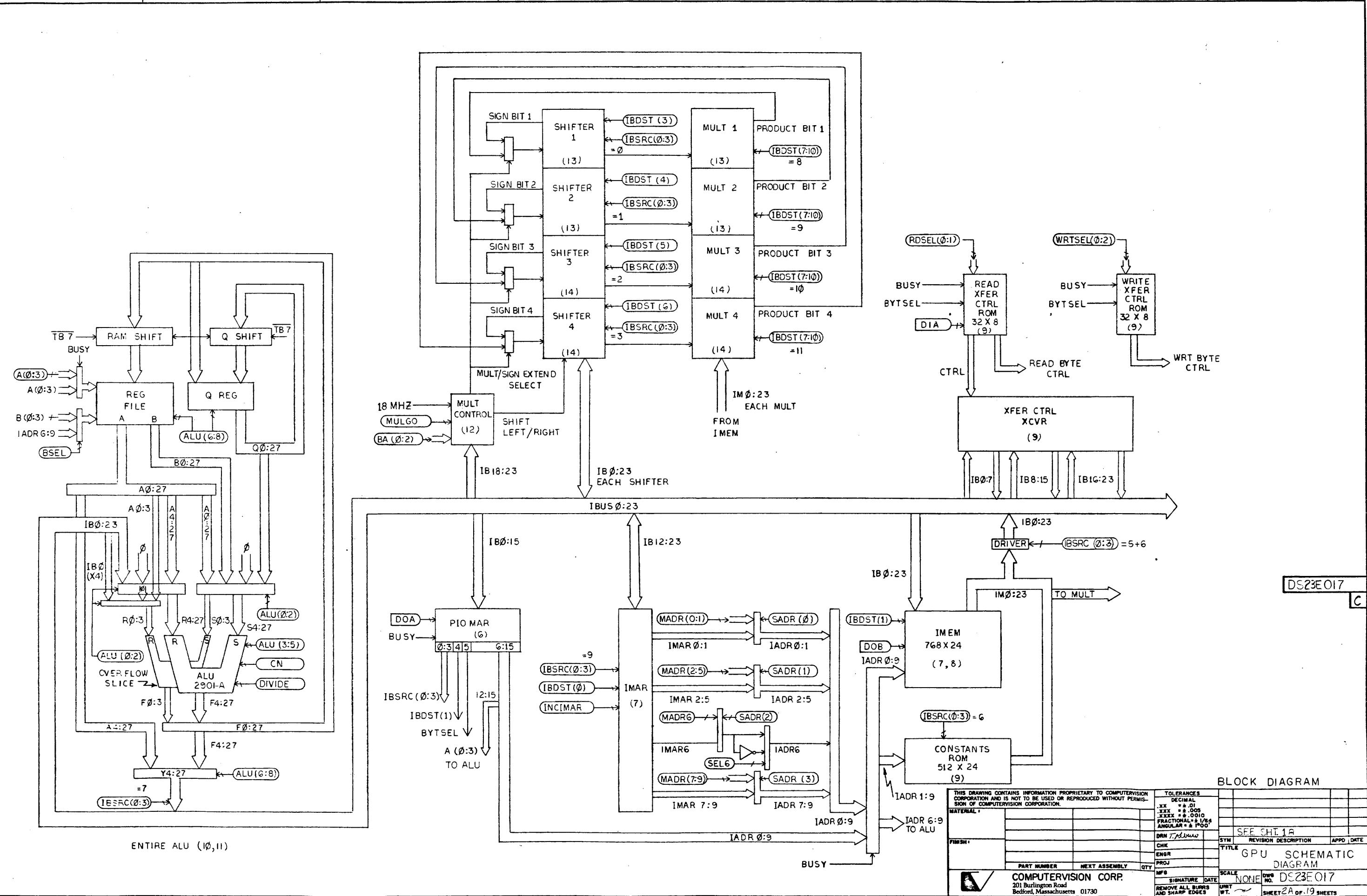


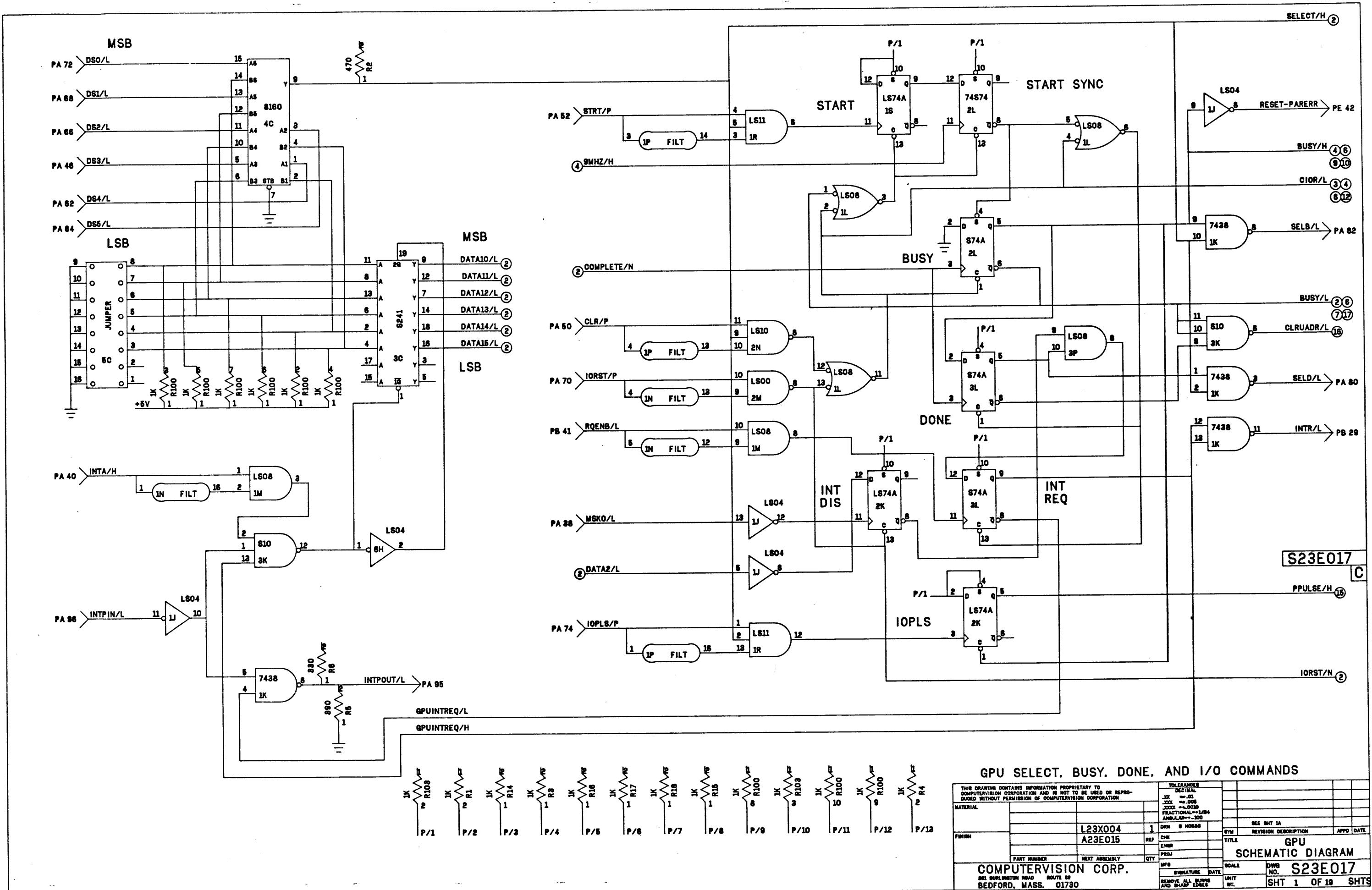
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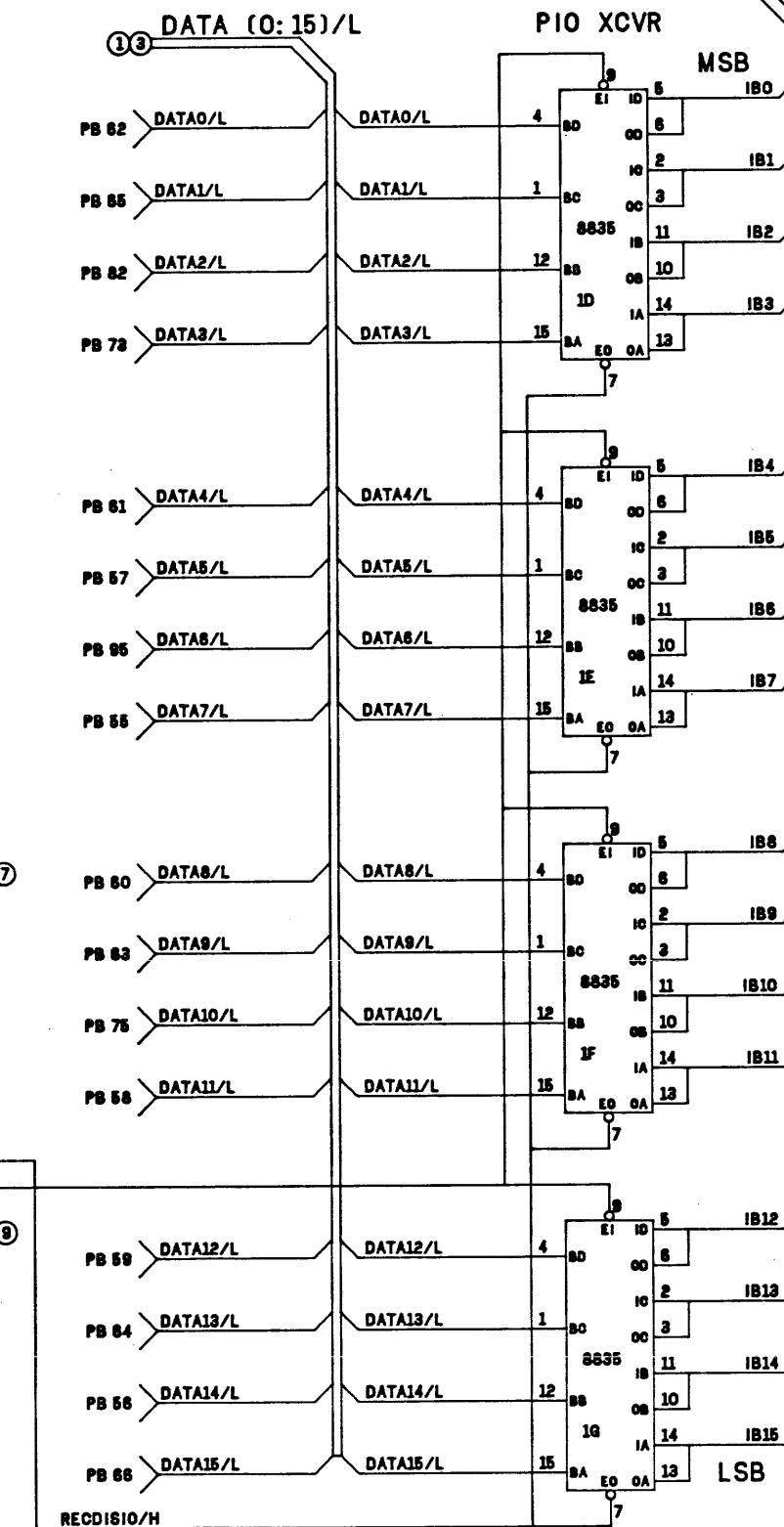
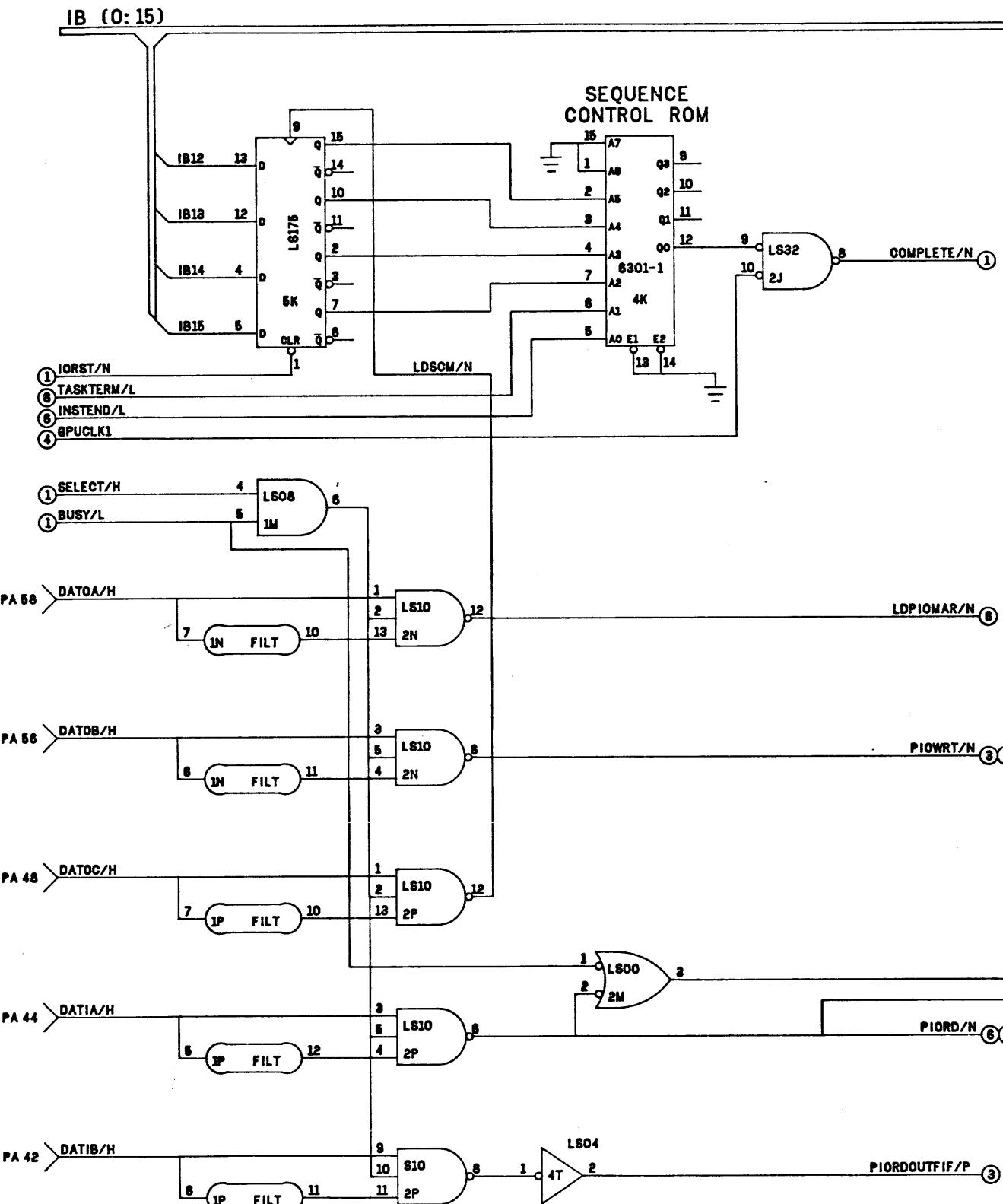
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2

1

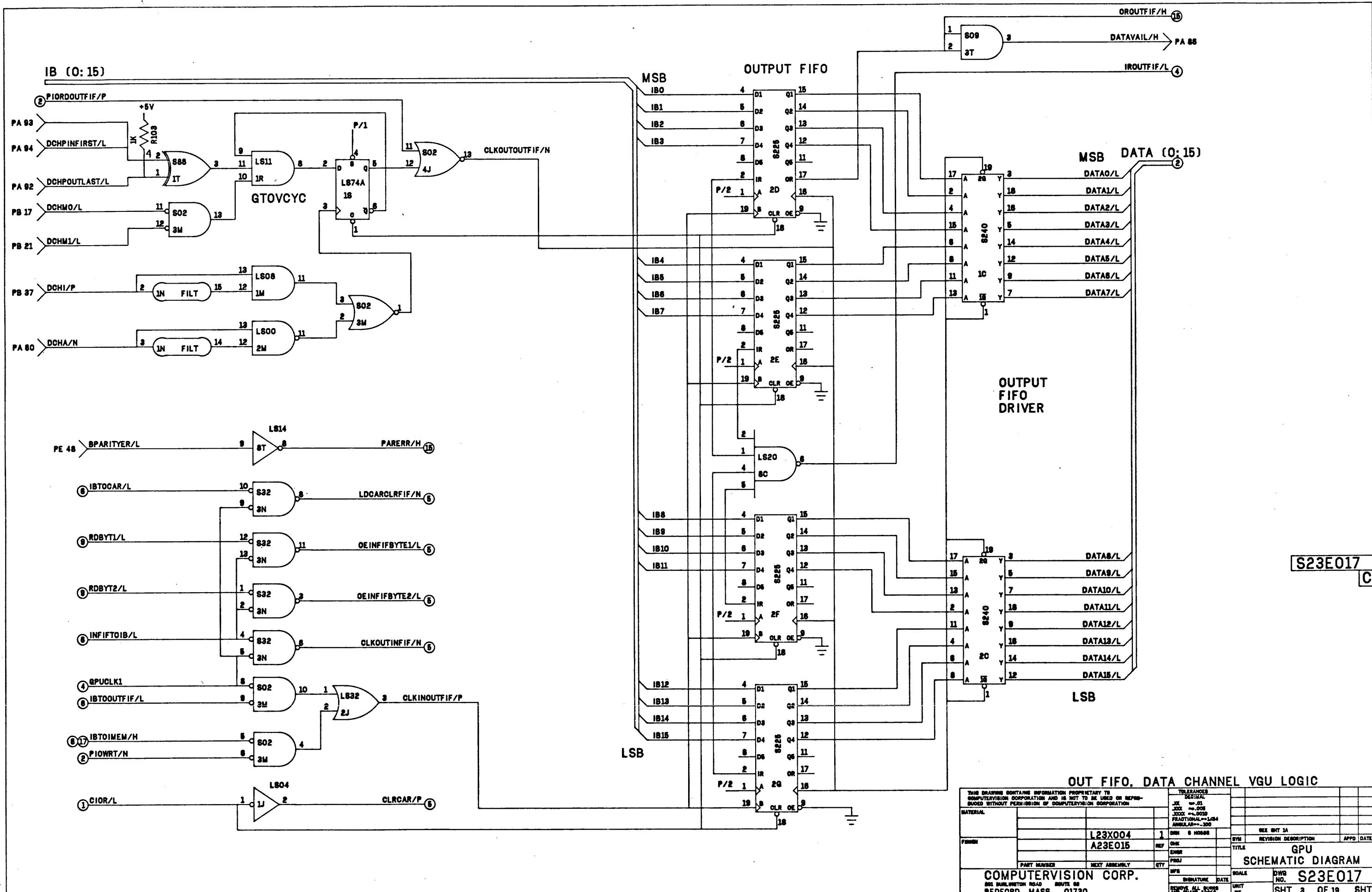


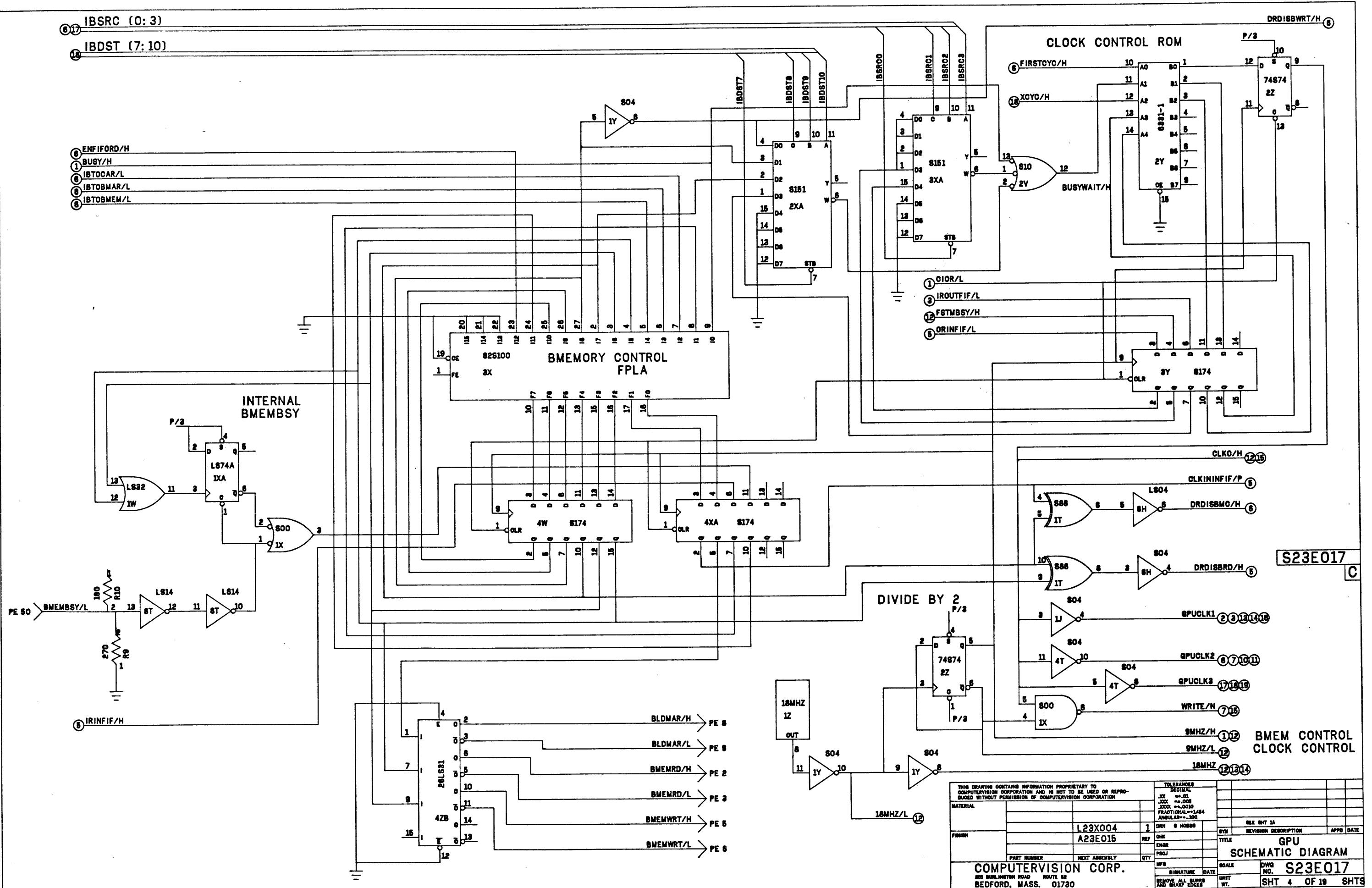


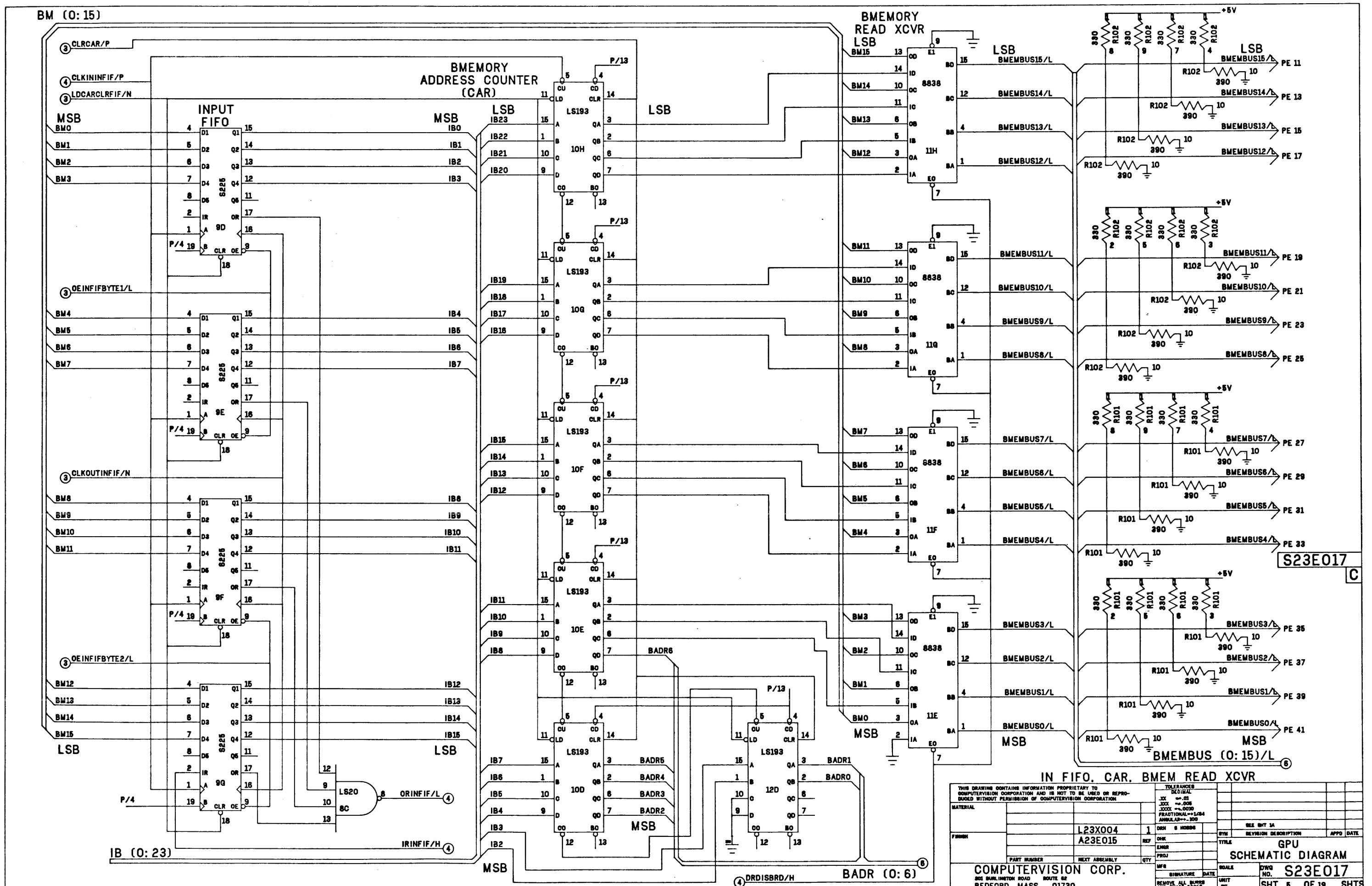


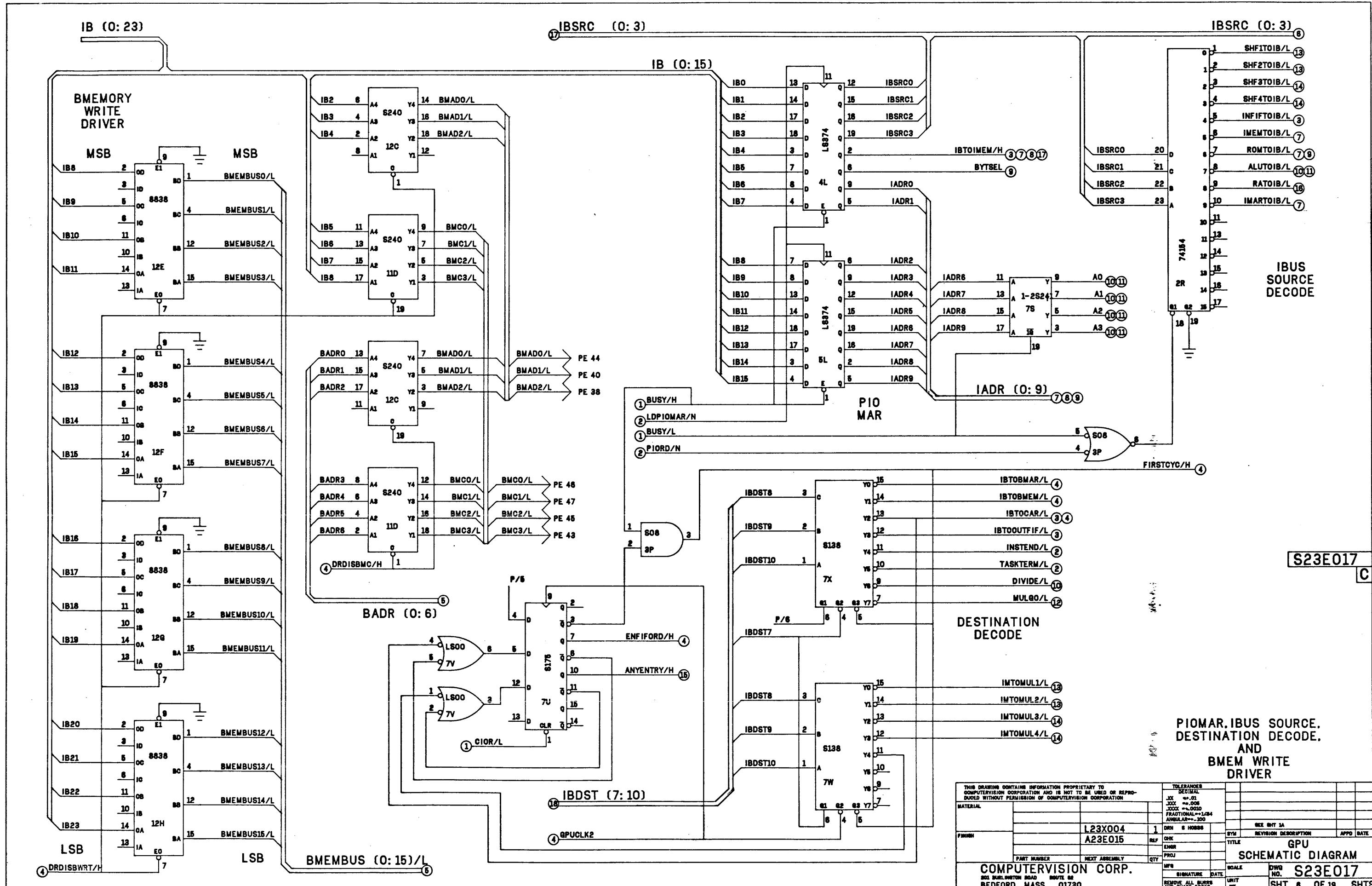
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES	
MATERIAL	FINISH	DEGREES	DECIMAL
		JX +/- .005	.000 +/- .005
		JXXX +/- .0010	FRACTIONAL-->.100
		ANGULAR-->.300	
L23X004	A23E015	1	DRW 8 NOBBS
REF CMC	REF ENR		REV B INT 2A
PROJ			TITLE GPU SCHEMATIC DIAGRAM
PART NUMBER	NEXT ASSEMBLY	QTY	DWG NO. S23E017
MPN	SOALKE	DWG NO.	S23E017
SIGNATURE	DATE	UNIT WT.	REMOVE ALL BURRS AND SHARP EDGES
			SHT 2 OF 19 SHTS

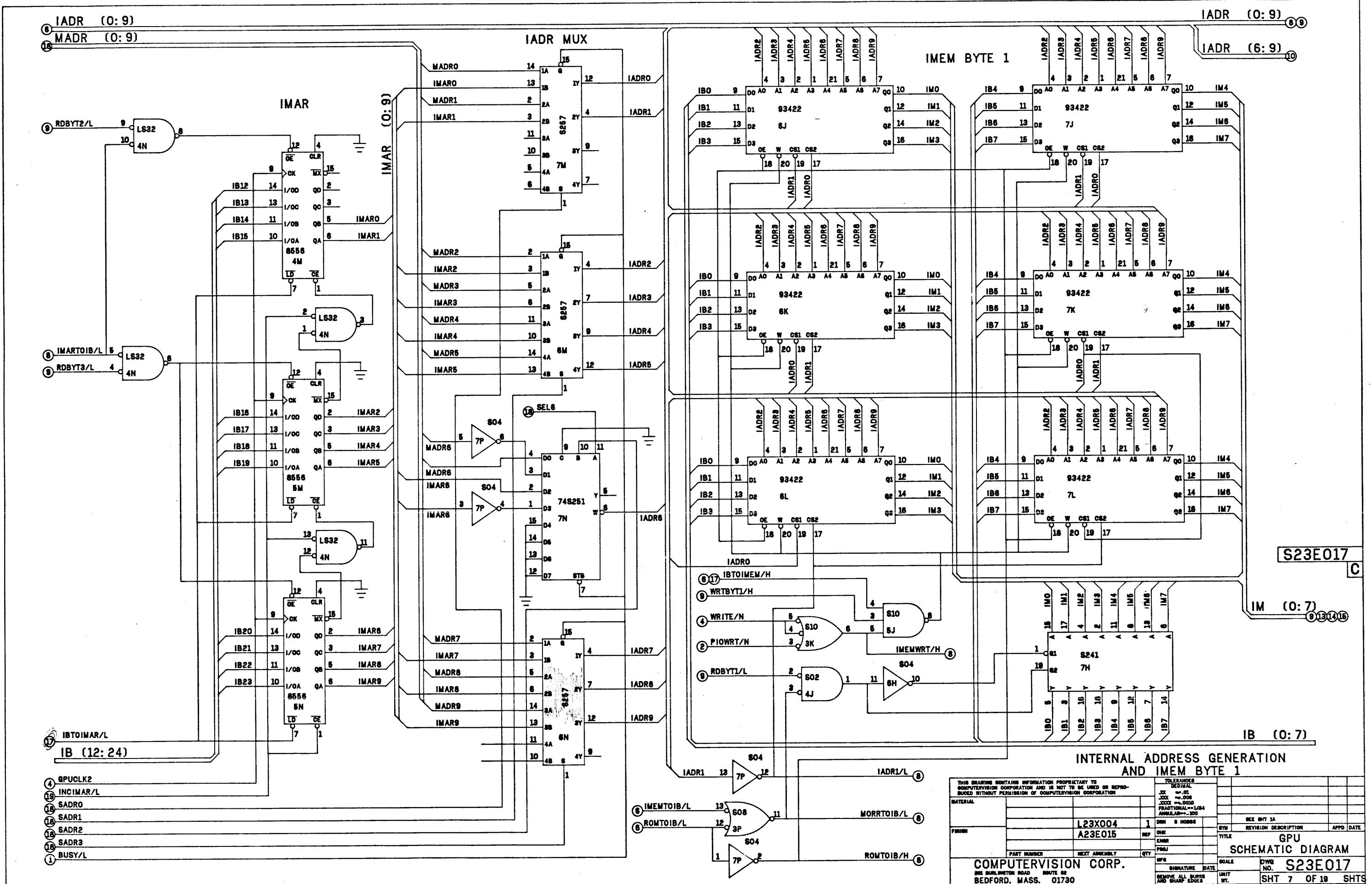
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100 BURLINGTON ROAD ROUTE 64  
BEDFORD, MASS. 01730

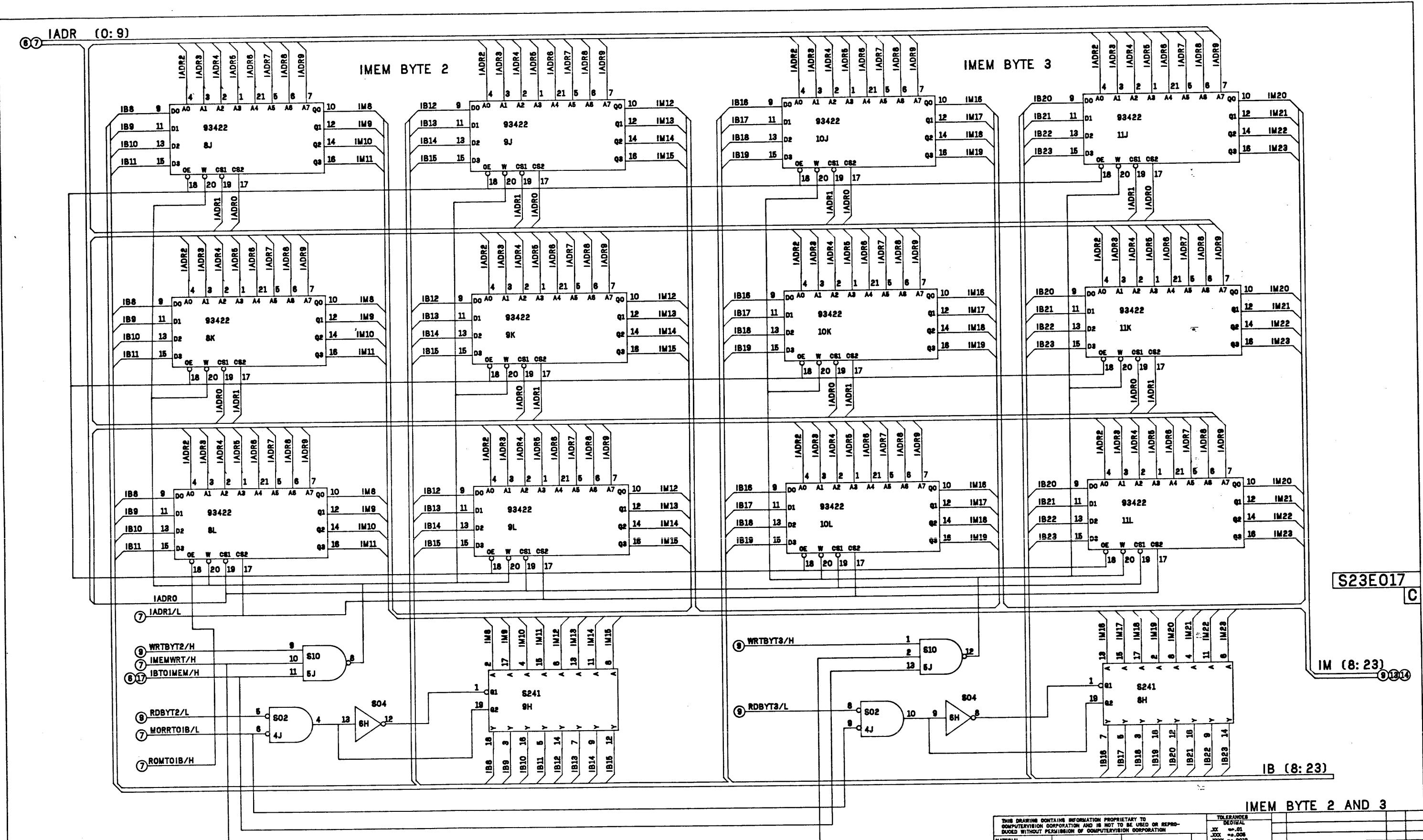






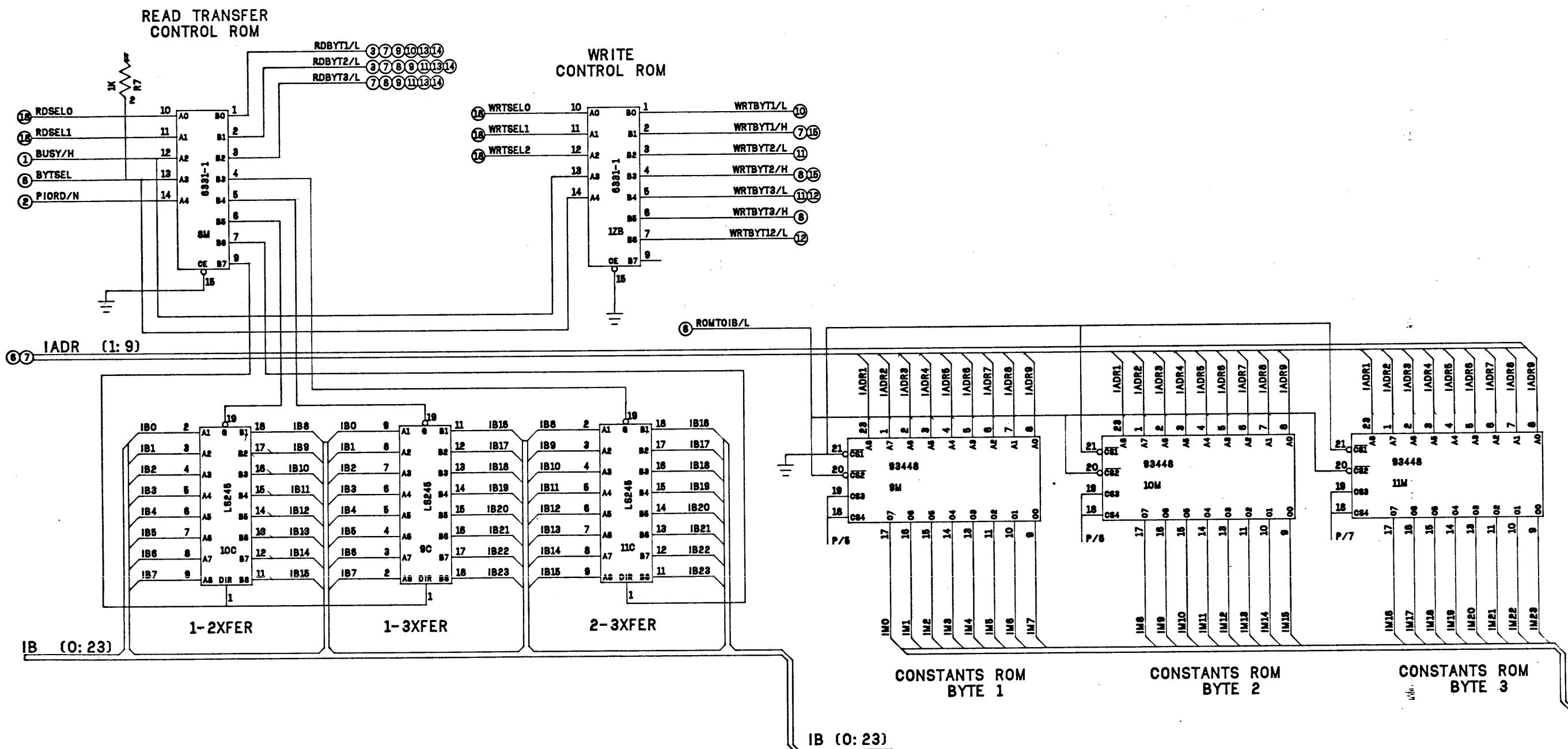






### **IMEM BYTE 2 AND 3**

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MATERIAL		JX .01			
		JXXX -.0006	JXXX +-.0010	FRACTIONAL--.1264	ANGULAR--.100
L23X004		1	DIN 8 HOBBS	SEE BHT 1A	
FINISH	A23E015	REF	BYN	REVISION DESCRIPTION	
		ENK	TITLE		APP'D DATE
		EMR	GPU		
PART NUMBER	NEXT ASSEMBLY	QTY	PROJ	SCHEMATIC DIAGRAM	
COMPUTERTVISION CORP.		MFG	SCALE	DWG NO.	S23E017
100 BURLINGTON ROAD ROUTE 62		SIGNATURE	DATE		
BEDFORD, MASS. 01730		REMOVE ALL BURRS AND SHARP EDGES		UNIT	SHT 8 OF 18 SHTS

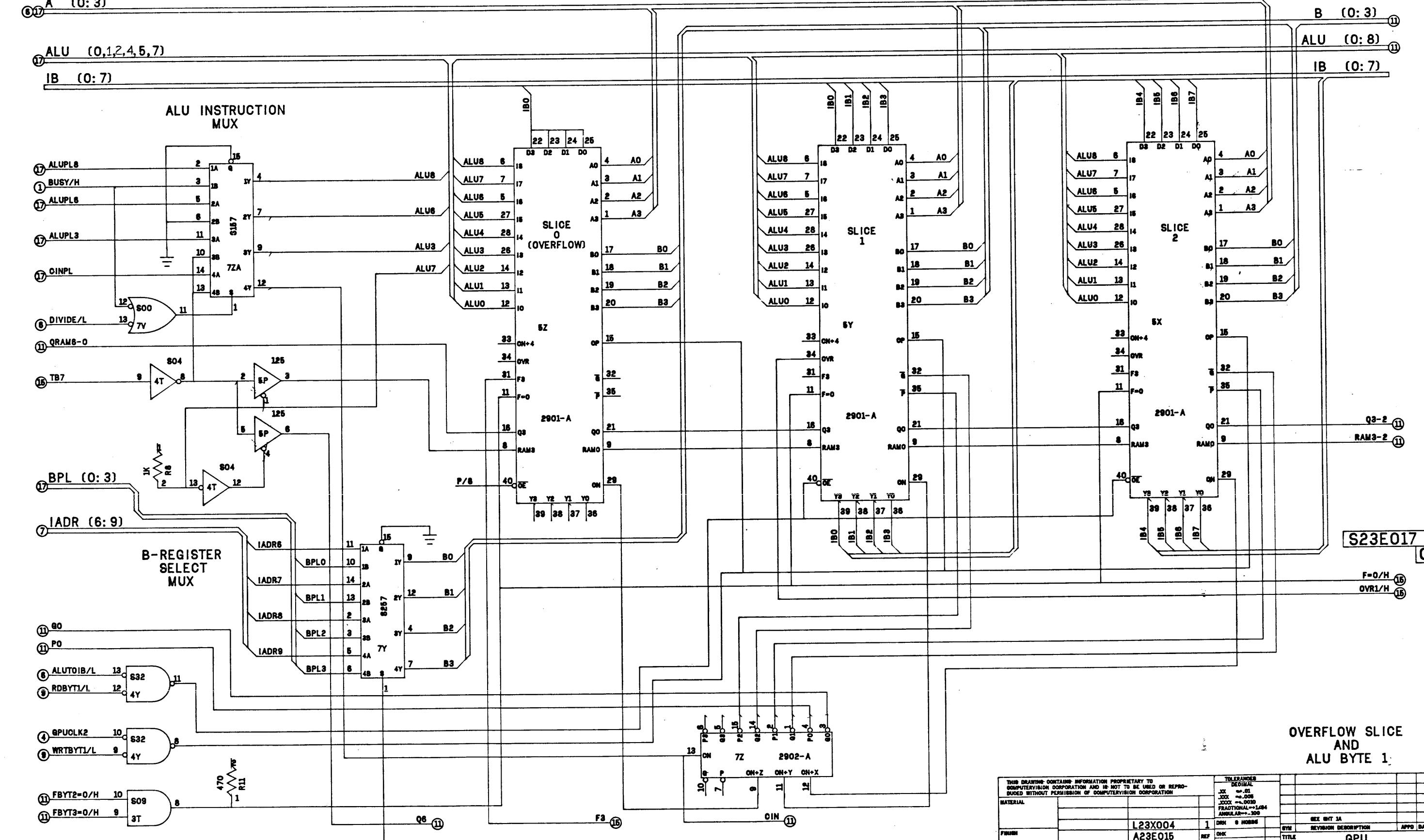


**IBUS TRANSFER CONTROL  
AND  
CONSTANTS ROM**

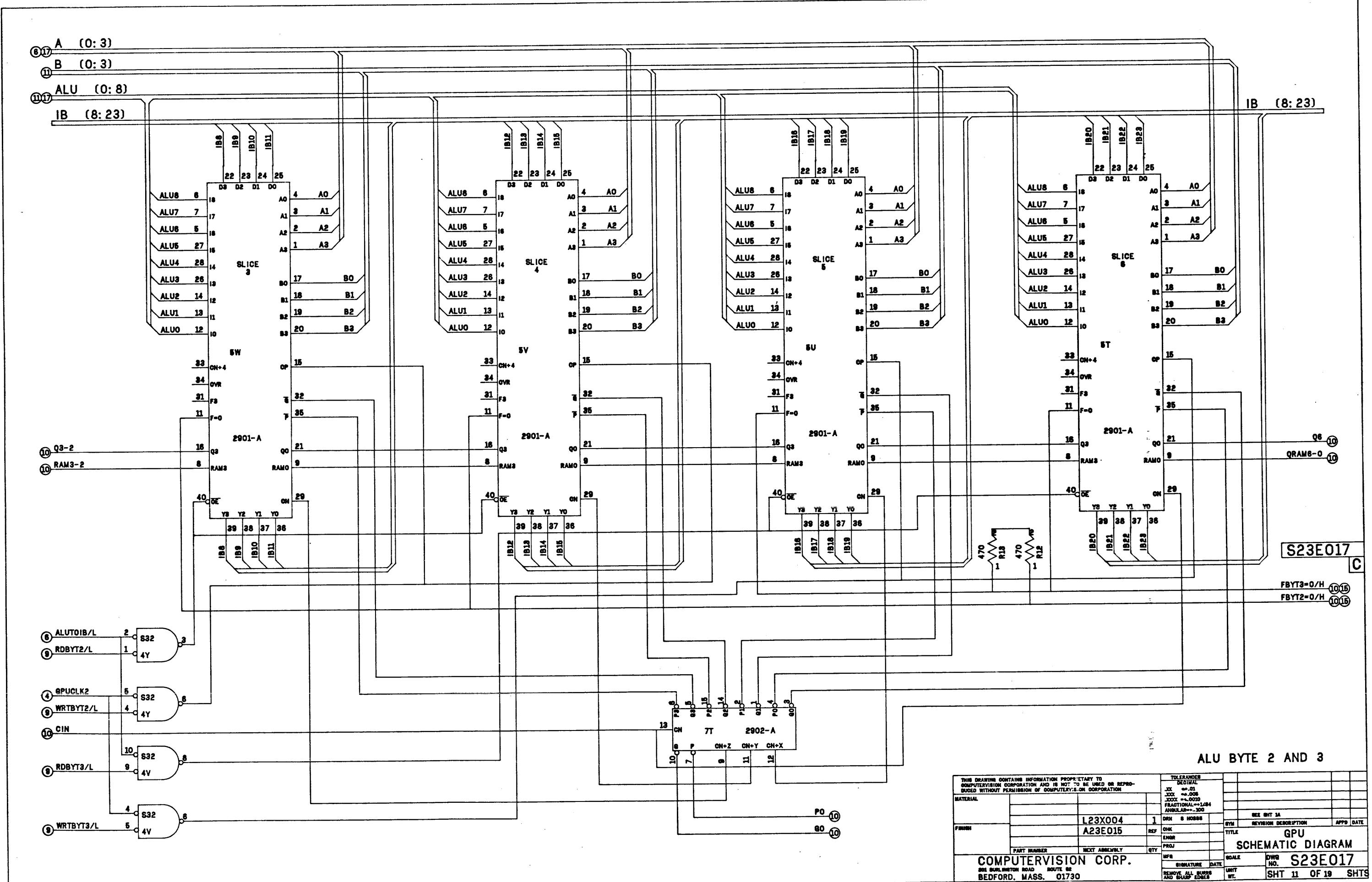
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MATERIAL	FINISH	DEVIATION	REF.
		.00 .001	
		.000 .0005	
		.0000 .00005	
		ANGULAR .004	
		AMBIENT .100	
			SEE SHT 2A
			REV. DESCRIPTION APP. DATE
		L23X004 1	DRAW. & HANDB.
		A23E015	REF. CHK
			ENGR.
			PROJ.
			MFG.
			SIGNATURE DATE
			SCALE DWG. NO. S23E017
			REVIEW ALL SURFACES UNIT WT.
			SHT 9 OF 19 SHTS

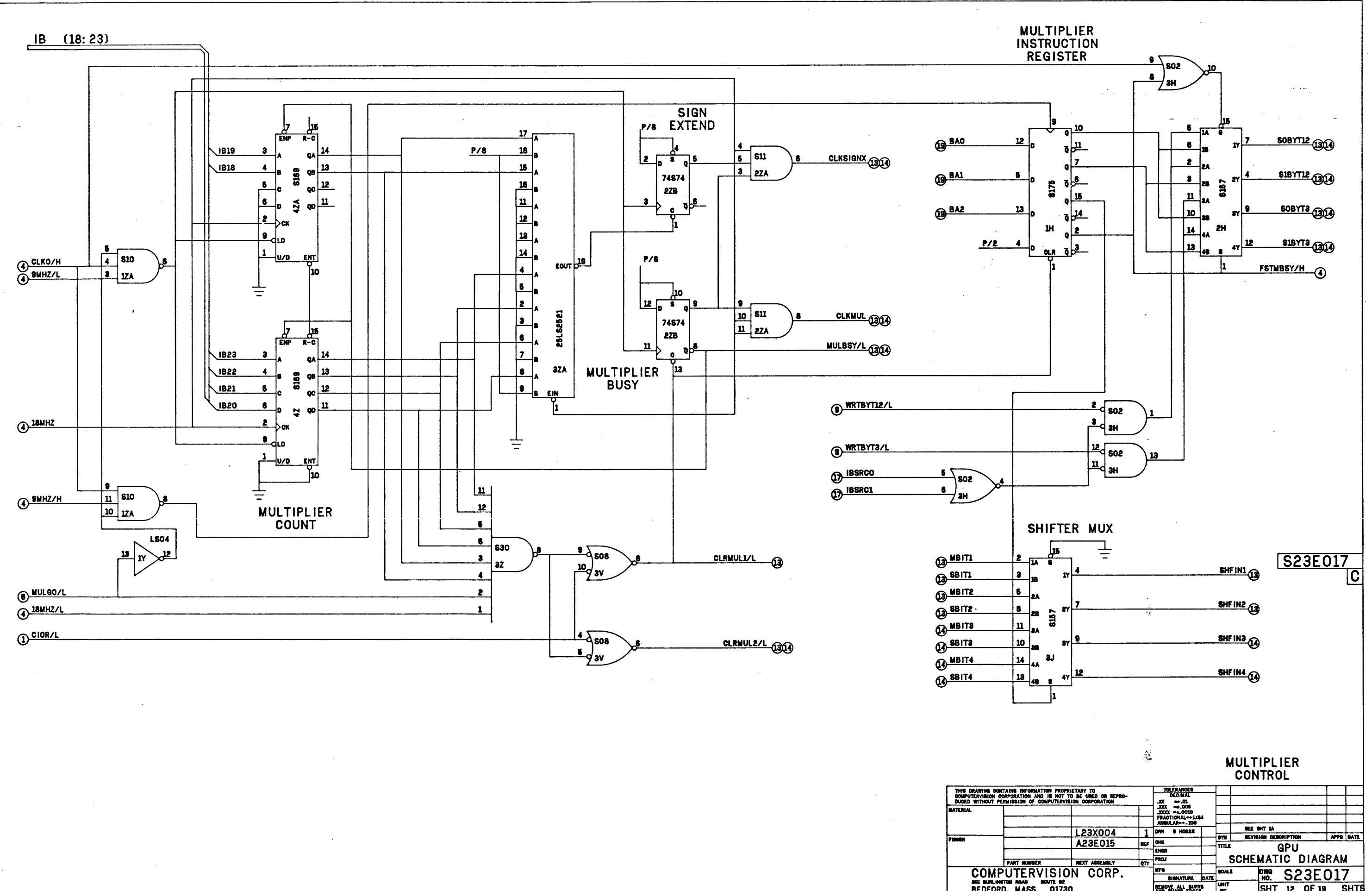
**SCHEMATIC DIAGRAM**

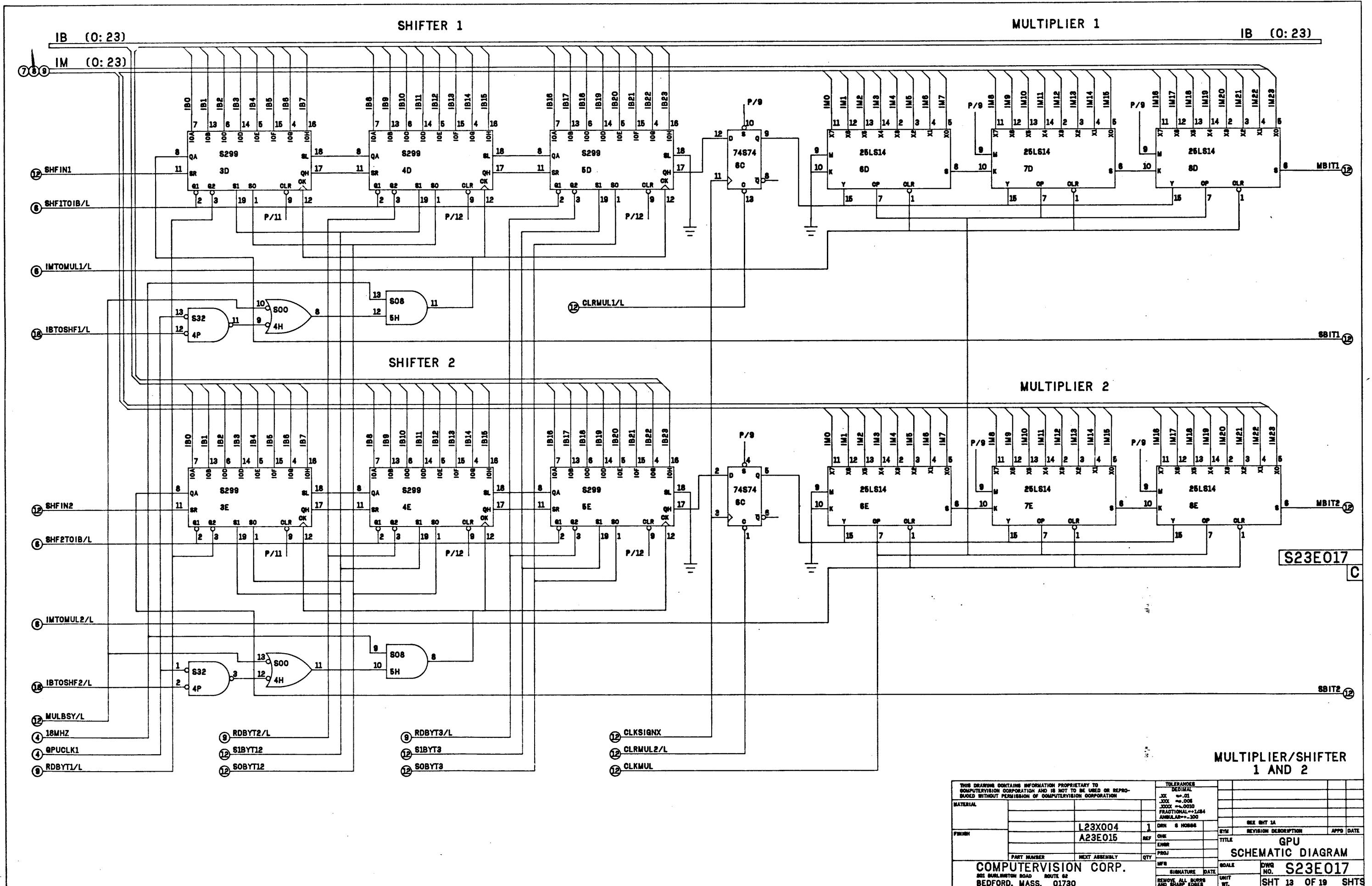
**COMPUTERVISION CORP.**  
301 BURLINGTON ROAD ROUTE 62  
BEDFORD, MASS. 01730

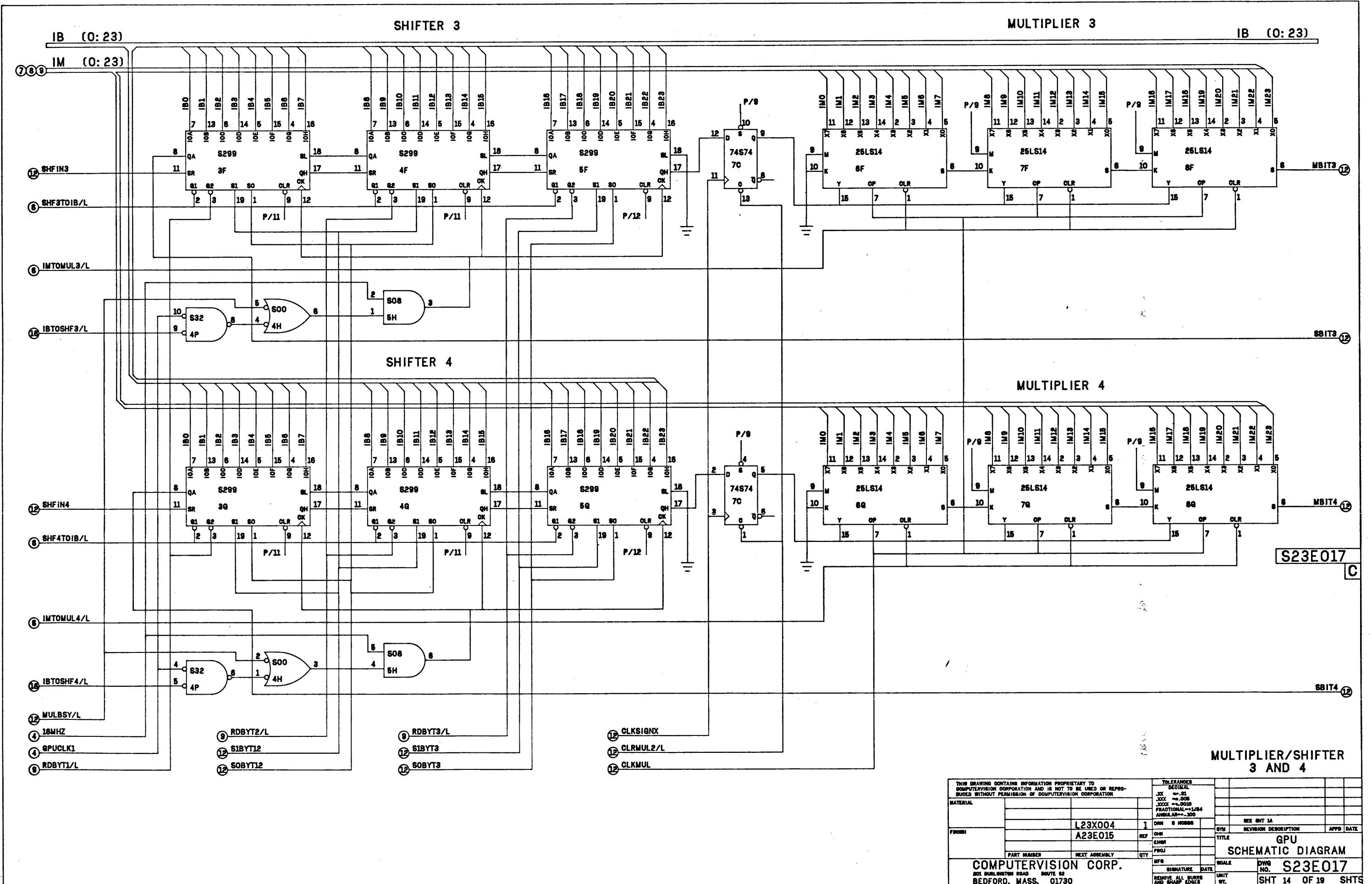


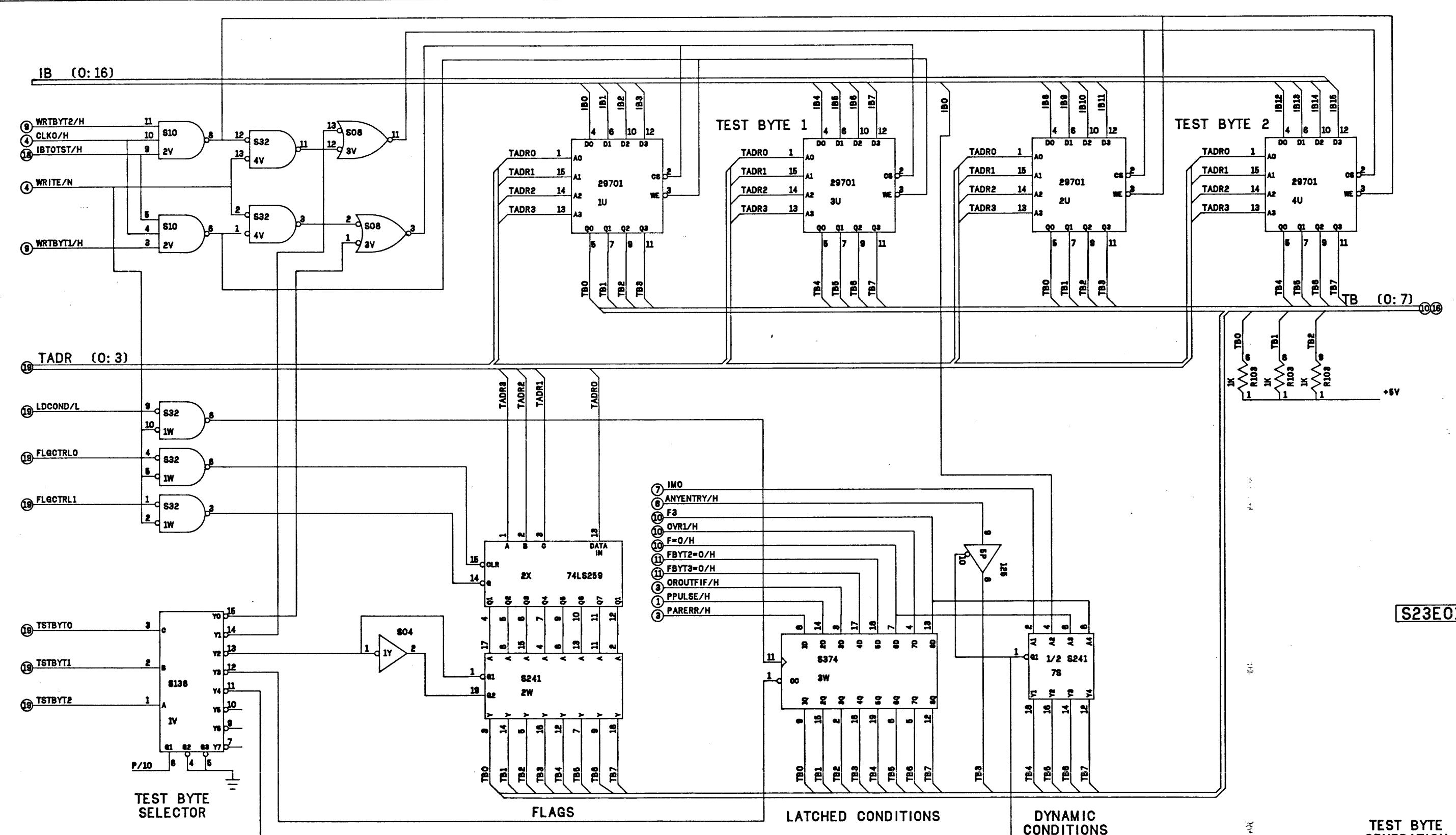
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERTVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERTVISION CORPORATION		TOLERANCES	
MATERIAL	FINISH	DECIMAL	DECIMAL
		.XX -.01	.XX -.01
		.XXX -.001	.XXX -.001
		FRACTIONAL--.000	FRACTIONAL--.000
		ANULAR--.300	ANULAR--.300
		L23X004	DRW 8 HORN
		A23E015	REF CHK
			ENR
			PROJ
			MFG
			SMALL
			DWG NO.
			S23E017
		REVISION DESCRIPTION	APP'DATE
		SEE SHT 1A	
		TITLE	
		GPU	
		SCHEMATIC DIAGRAM	
PART NUMBER	NEXT ASSEMBLY	QTY	
COMPUTERTVISION CORP.			
551 BURLINGTON ROAD ROUTE 62			
BEDFORD, MASS. 01730			
REMOVE ALL BURRS AND SHARP EDGES	UNIT WT.	SHT 10 OF 19 SHTS	



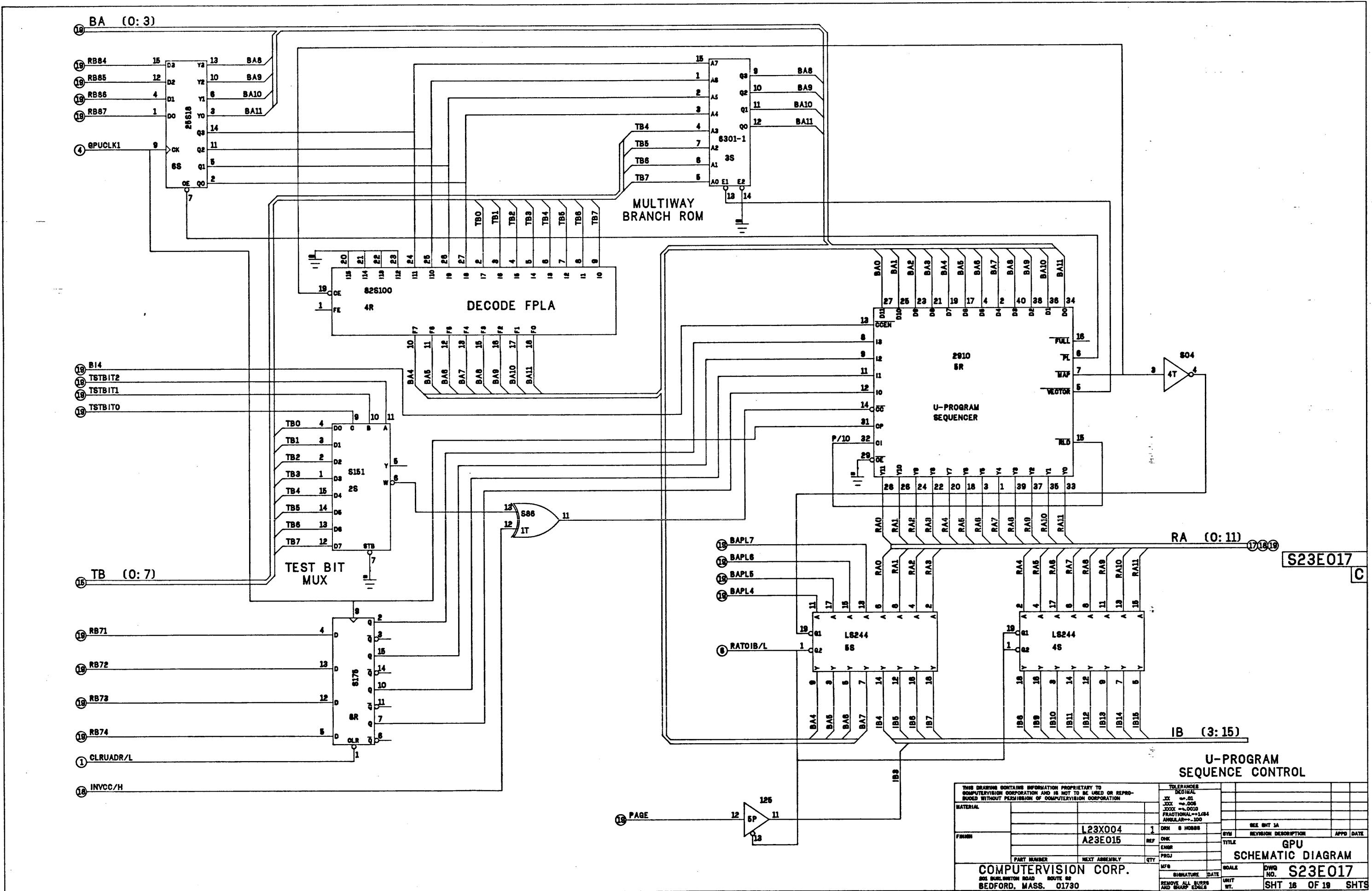


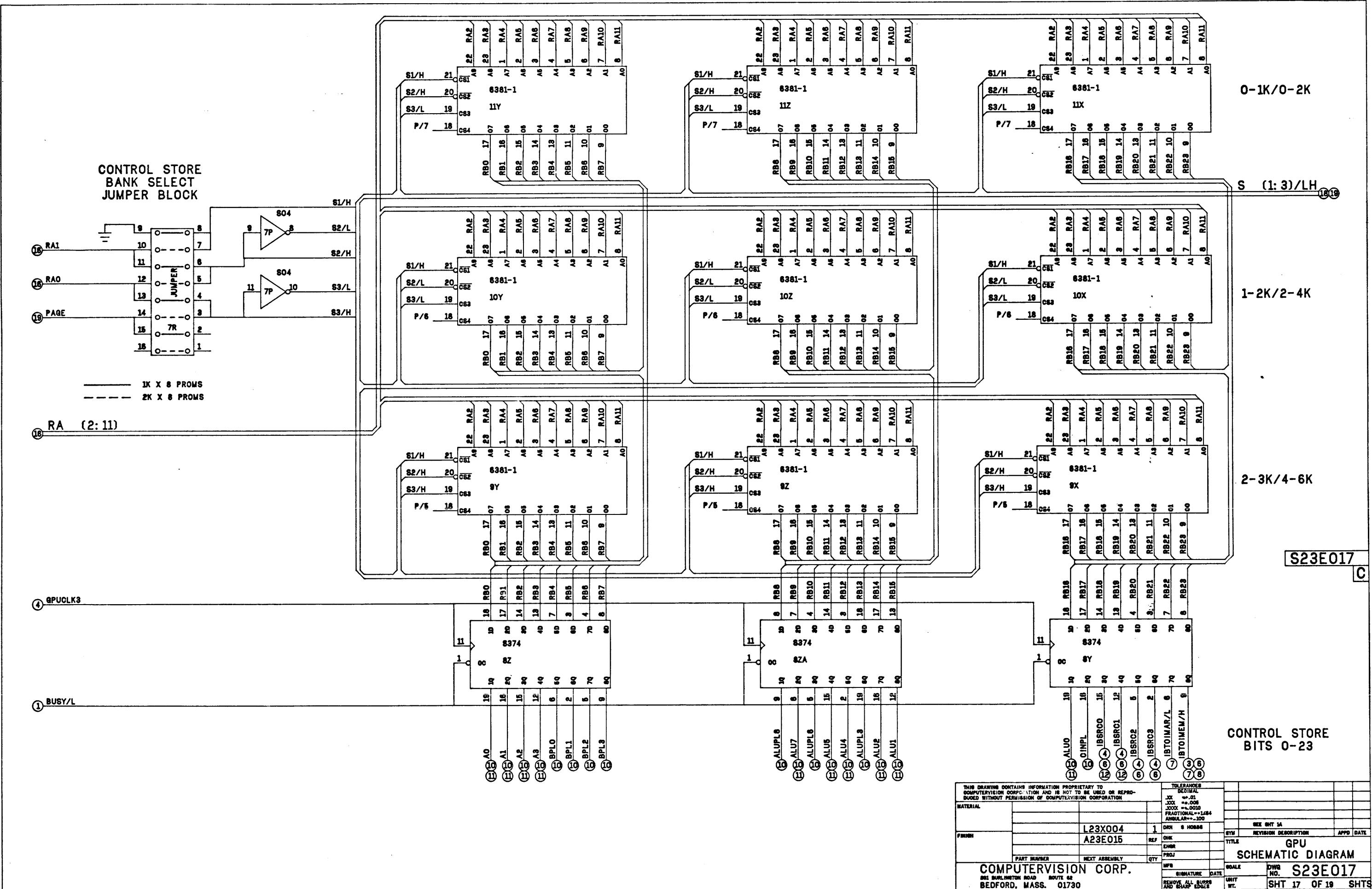


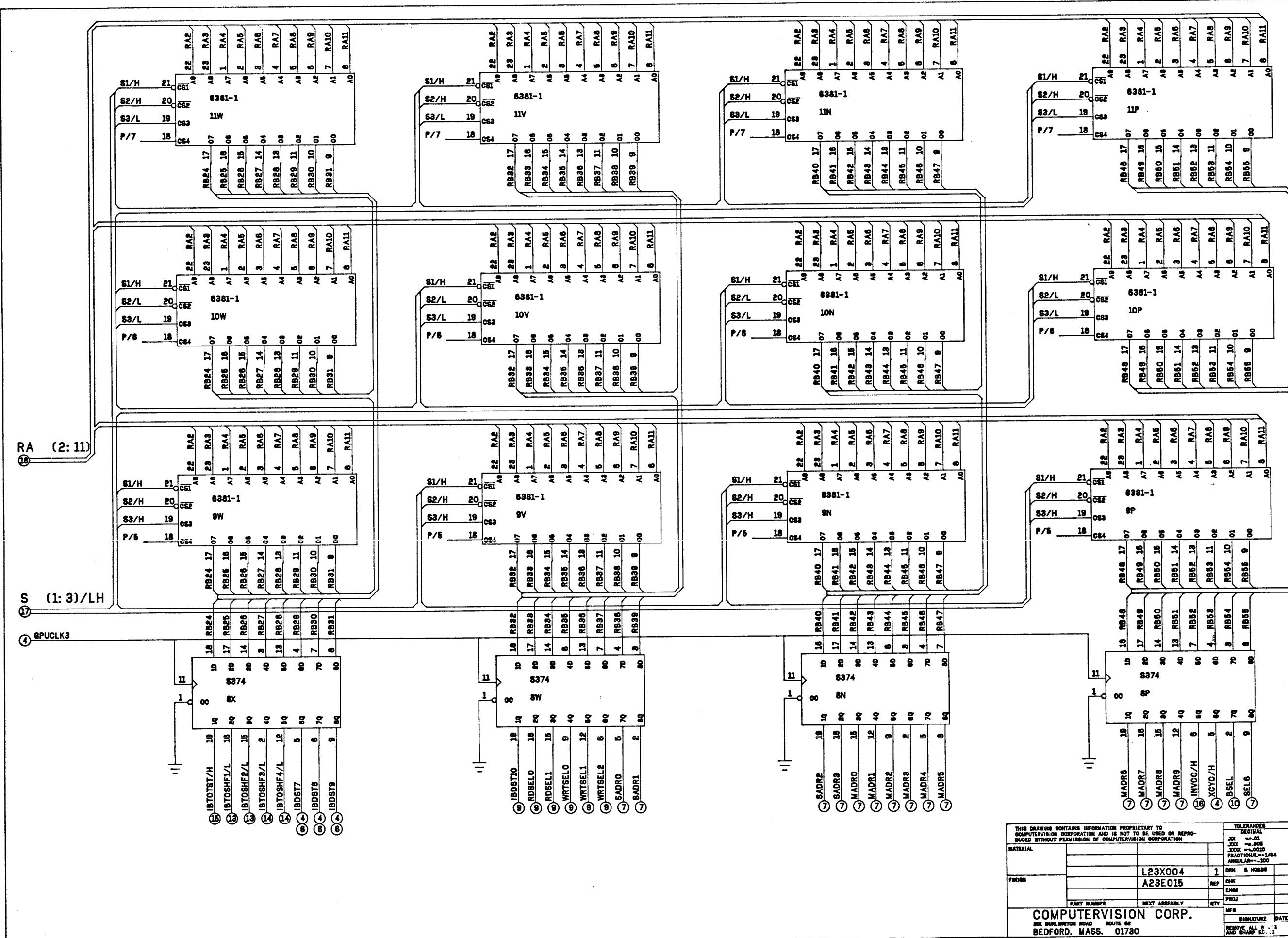




THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION		TOLERANCES	
MATERIAL	DEUTSCH	UNIT	REV. SHT 1A
FINISH	XXC XXC XXXX XXXX	±0.01 ±0.02 ±0.020 ±0.020	REF CDR 8 NOSES
		FRACTIONAL=>1/64	REV. CDR
		ANGULAR=>.200	TITLE GPU SCHEMATIC DIAGRAM
PART NUMBER	NEXT ASSEMBLY	BY	DWG. NO. S23E017
COMPUTEVISION CORP. BOX BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730	BY SIGNATURE DATE	SCALE	DWG. NO. S23E017
	REMOVE ALL BURRS AND SHARP EDGES	UNIT	SHT 15 OF 19 SHTS







0-1K/0-2K

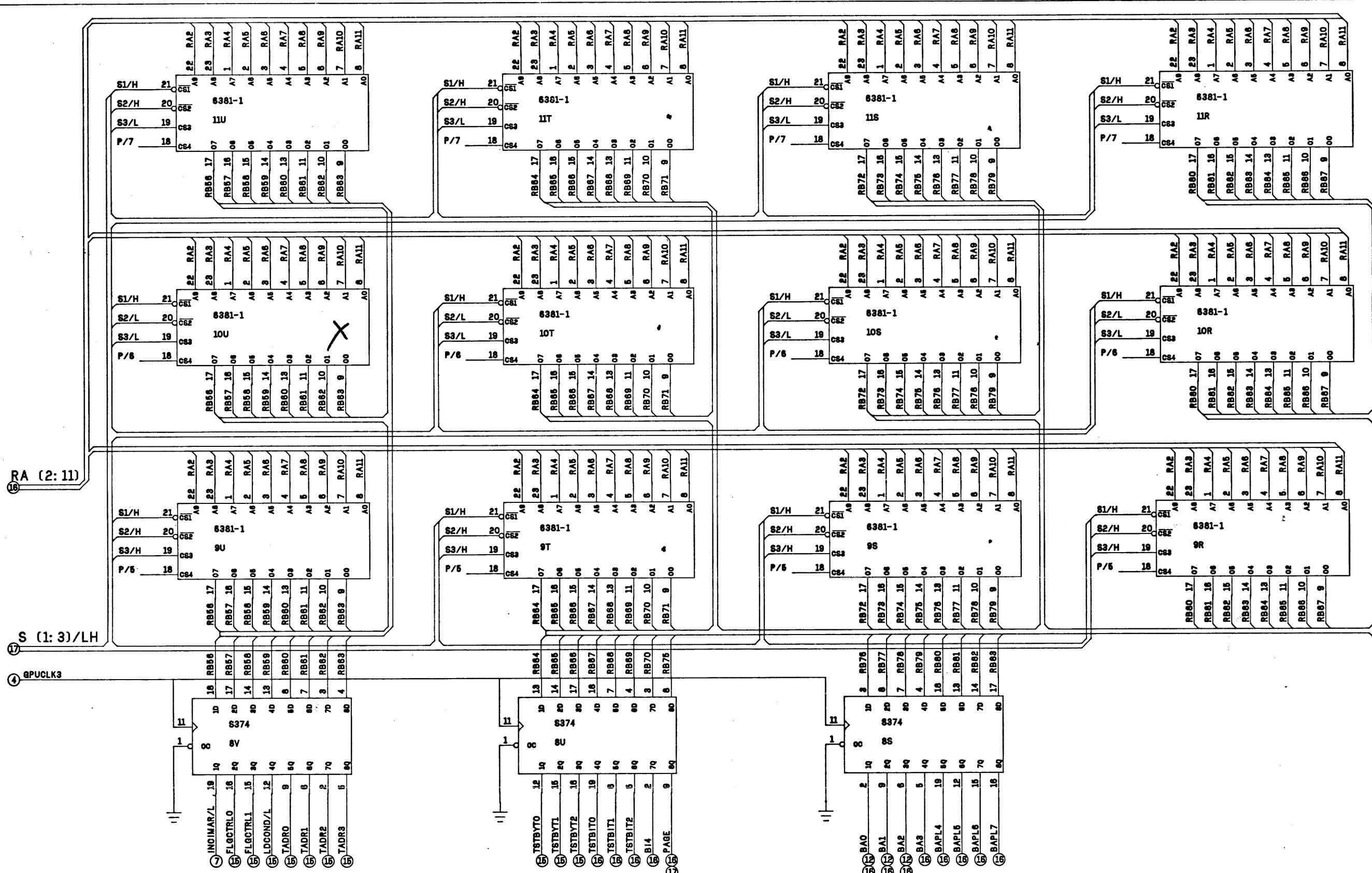
1-2K/2-4K

2-3K/4-6

S23E01

**CONTROL STORE  
BITS 24-55**

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES			
MATERIAL		DECIMAL			
	JX .001-.01 XX .0001-.005 XXX -.00010 FRACTIONAL -.1254 ANGULAR -.100				
FINISH	L23X004	1	DRA. S HOBBS	SEE SHT 1A	
	A23E015	REF	CHK	SHT	REVISION DESCRIPTION
			ENR	TITLE	
PART NUMBER	NEXT ASSEMBLY	PROJ	GPU		
MFG		SCHEMATIC DIAGRAM			
SIGNATURE		DATE	SCALE	DWG NO.	S23E017
REMOVE ALL B .3 AND SHARP EDGES			UNIT	SHT	OF 19
BEDFORD, MASS. 01730			WT.	SHTS	



0-1K/0-2K

1-2K/2-4K

2-3K/4-6K

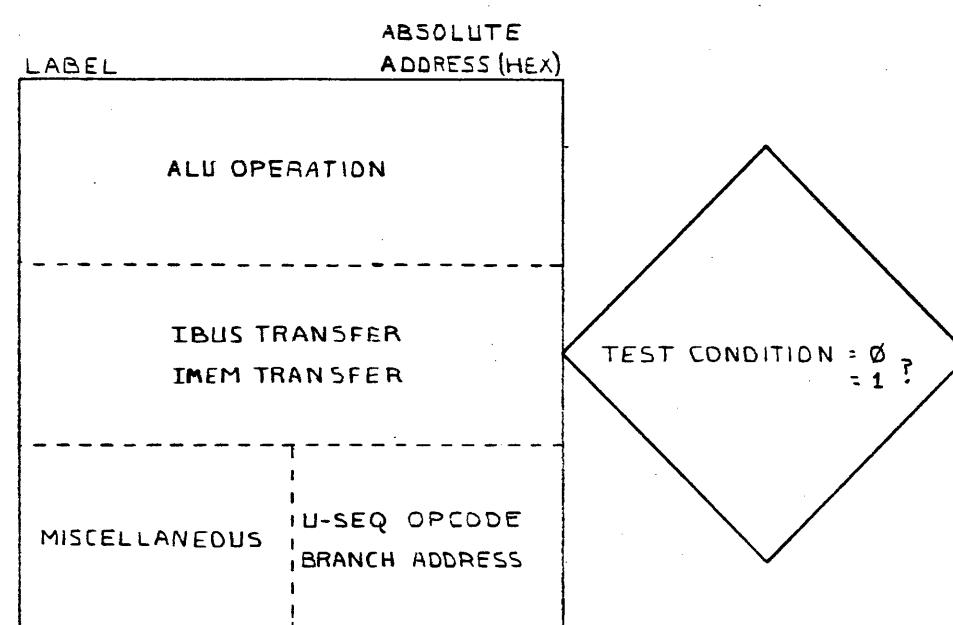
S23E017

1

**CONTROL STORE  
BITS 56-87**

S DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION			TOLERANCES			
			DECIMAL			
			.000			
			.0000			
			.00010			
			PRIMARIAL 1/84			
			ANGULAR -100			
	L23X004	1	DRW 8 HOBBES	SEE SHT 1A		
	A23E015	REF	ENGR	REV BMT 3A		
				REVISION DESCRIPTION		
				APPRO DATE		
	PART NUMBER	NEXT ASSEMBLY	QTY	PROJ	GPU	
				MFB	SCHEMATIC DIAGRAM	
				SIGNATURE	SCALE	DWG NO.
				DATE:		S23E017
COMPUTERVISION CORP. 501 BURLINGTON ROAD ROUTE #2 BEDFORD, MASS. 01730			REMOVE ALL BURRS AND SHARP EDGES	UNIT	SHT	19 OF 19 SHTS

## **GPU Microprogram Flow Charts**



ALU OPERATION

R (OP) S, SHIFT → DEST  
R = (RA, 0, IB)  
RA = REG FILE A-ADDR  
IB = IBUS DATA  
S = (RA, RB, 0, Q)  
RB = REG FILE B-ADDR  
Q = Q REG  
(OP) = (+, -, OR., AND., EXOR., EXNOR.)  
SHIFT = (RS, LS) IF A SHIFT EXISTS  
RS = RIGHT SHIFT  
LS = LEFT SHIFT  
DEST = (RB, Q, F)  
F = ALU OUTPUT

NOTE: WHEN RB OR Q IS SELECTED AS THE ALU DEST, THE RESULT WILL ALSO APPEAR AT THE F OUTPUT

#### IBUS TRANSFER (IB)

IBUS SOURCE: RDSEL → IBUS DEST: WRTSEL  
IBUS SOURCES = SHF1

SHF2  
SHF3  
SHF4  
INFIIFO

ALU  
RA

IMAR

IMEM - [SADR: MADR] IMEM  
ROM - [SADR: MADR] ROM

RDSEL = (RDALL, RD1, RD2, RD3)

IBUS DESTINATIONS = BMAR  
BMEM

CAR  
OUT FIFO

IMAR

IMEM - [SADR: MADR] IMEM  
TEST - [TADR] TEST

SHF1  
SHF2

SHF3  
SHF4

WRTSEL = (WRT0, WRT1, WRT2, WRT3  
WRT12, WRT13, WRT23, WRTALL)

#### IMEM TRANSFER

[SADR: MADR] IMEM → IMEM DESTINATION

IMEM DESTINATIONS = MUL1  
MUL2  
MUL3  
MUL4

#### U-SEQ OPCODE

SEE THE U-CODE LISTING FOR THE 16 POSSIBLE OPCODES AND THEIR DEFINITIONS

#### BRANCH ADDRESS

:XYZ - REPRESENTS THE LABEL THAT A JUMP WILL GO TO UPON EXECUTION

( ) - REPRESENTS AN ABSOLUTE NUMBER

#### MISCELLANEOUS

TASKTERM

LDCOND

XCYC

INCIMAR

INV

MULGO (OP)

(OP) = (LSHF, RSSEX, MULT)

DIVIDE

CLRFFLAGS

FLAG (X) = (0, 1)

X = 0, 1, 2, ..., 7

INSTEND

IADRB

P2

#### TEST CONDITION

TEST BYTE 1

[TADR] TSTBYT1 (TSTBIT) = (0, 1) ?

TEST BYTE 2

[TADR] TSTBYT2 (TSTBIT) = (0, 1) ?

FLAGS TEST BYTE

FLAG (X) = (0, 1) ?

X = 0, 1, 2, ..., 7

LATCHED CONDITIONS TEST BYTE

F = 0 ?

FBYT2 = 0 ?

FBYT3 = 0 ?

F3 = 1 ?

OVR1 = 1 ?

DYNAMIC CONDITIONS TEST BYTE

F = 0 ?

F3 = 1 ?

IB0 = 1 ?

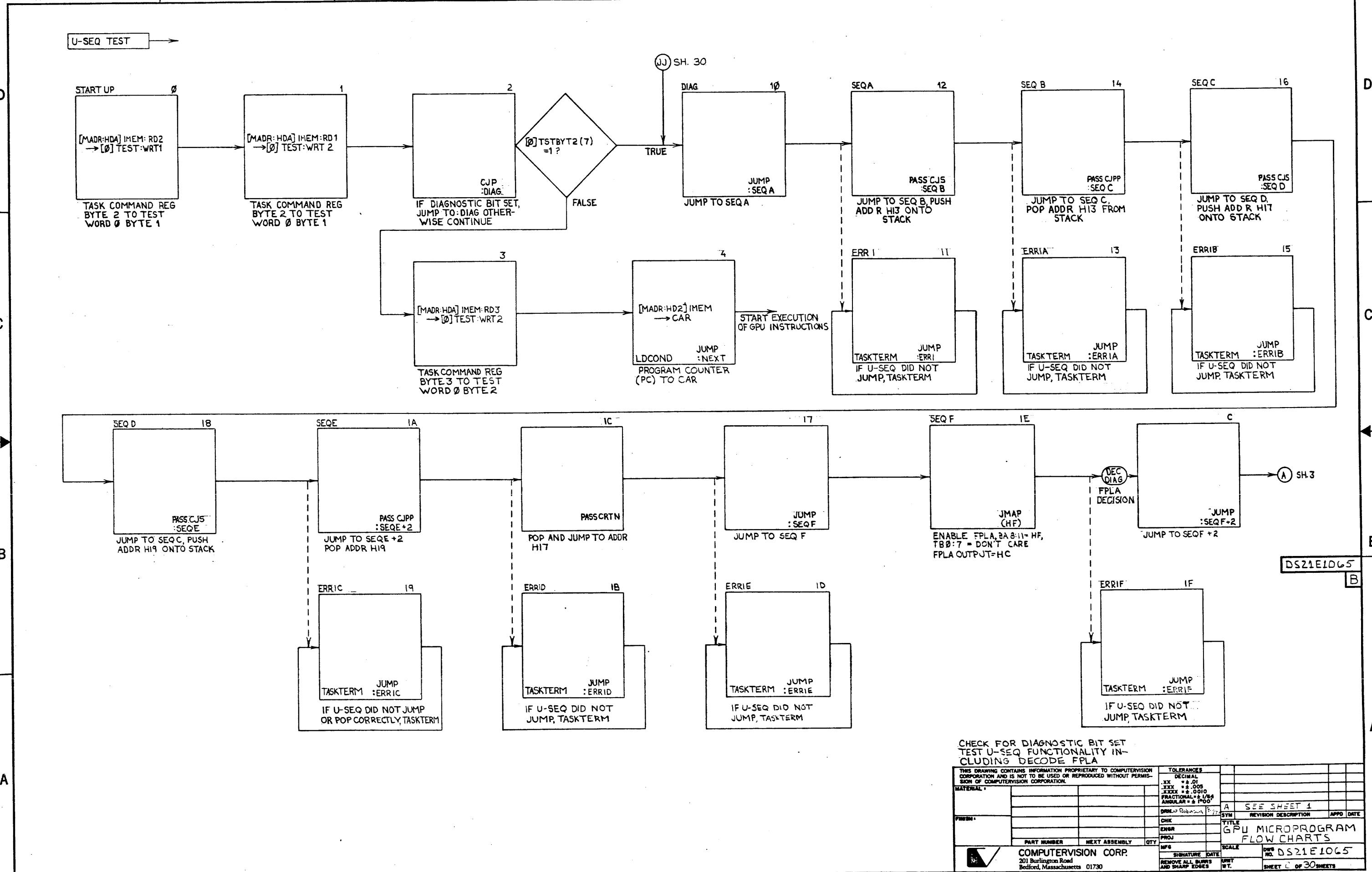
IM0 = 1 ?

NOTE: THESE ARE DENOTED BY THE WORD "DYNAMIC" WITHIN THE TEST DIAMOND

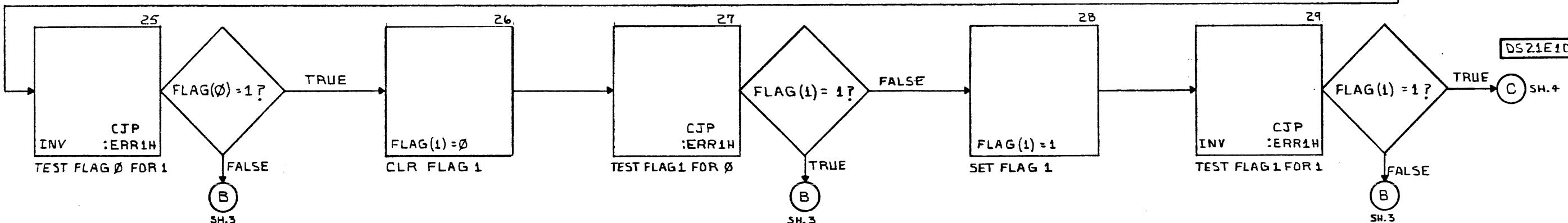
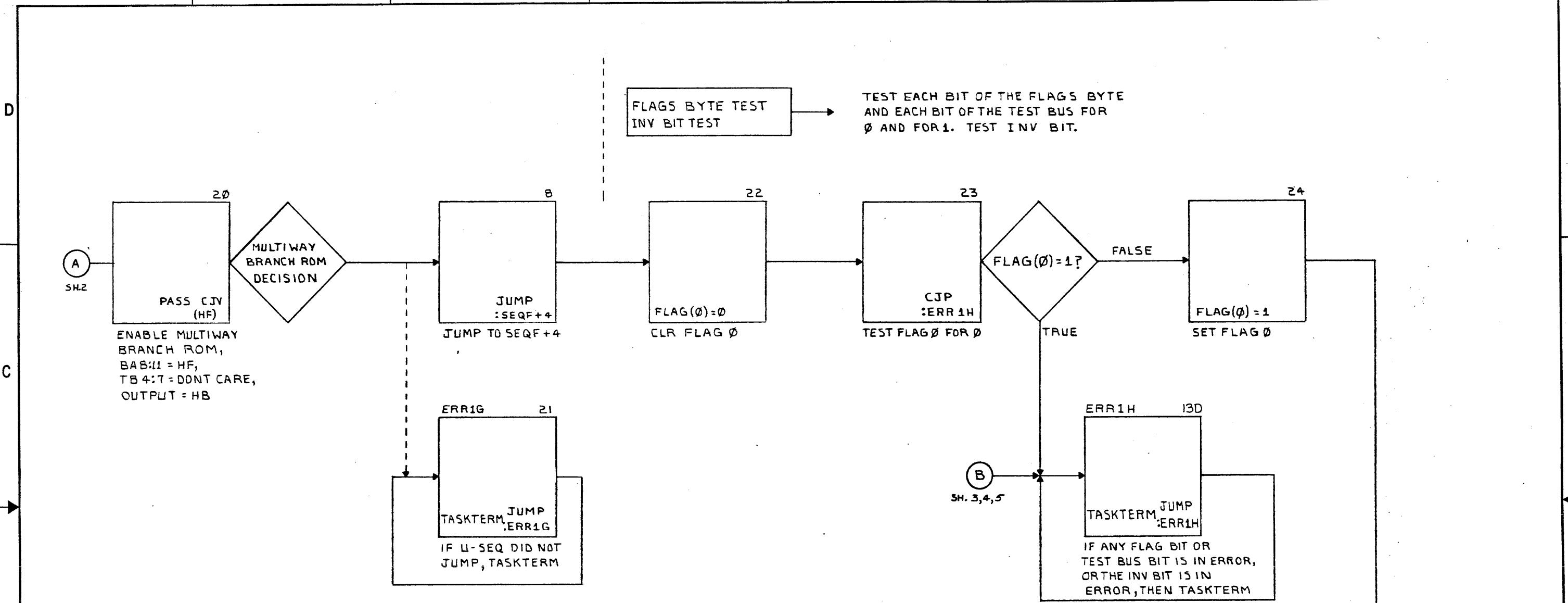
DS21E1065

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MATERIAL:		DECIMAL		
		.XX ± .01		
		.XXX ± .005		
		.XXXX ± .001		
		FRACTIONAL ± 1/64		
		ANGULAR ± 1°00'		
PRINTS:		B ECO #3421 L21X009 1		
		CHK L21X009 10-77		
		ENGR L21X009 10-77		
		PROJ L21X009 10-77		
		MPN		
		SIGNATURE DATE	SCALE	DWG NO. DS21E1065
		REMOVE ALL BURRS AND SHARP EDGES	UNIT WT.	
				SHEET 1 OF 30 SHEETS

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



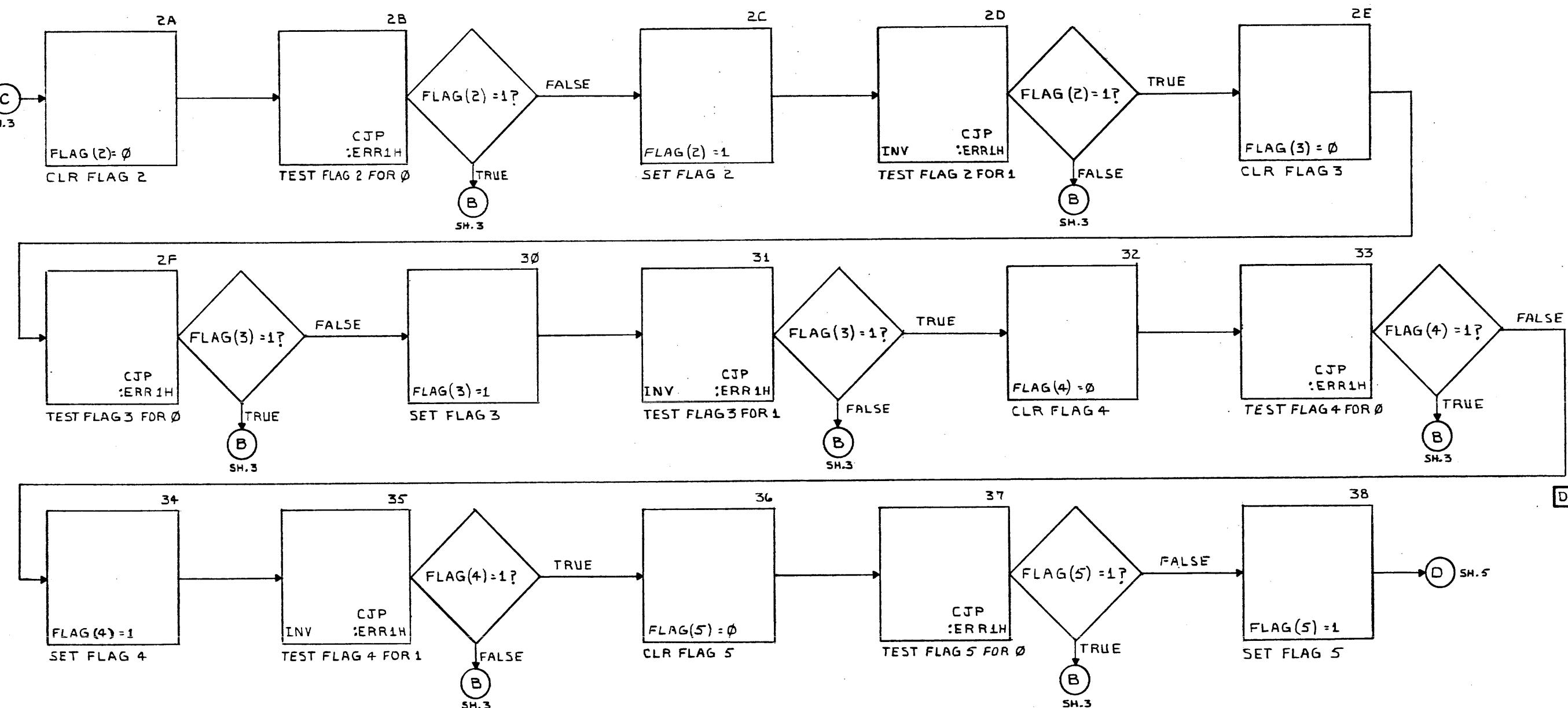
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TOLERANCES			
DECIMAL	± .01		
XX	± .005		
XX.X	± .0010		
XXXX	± .0001		
FRACTIONAL	± 1/64		
ANGULAR	± 1° 00'		
MATERIAL		A SEE SHEET 1	
SH.3		SYM	
DRW D.O'Hearn 10-79		REVISION DESCRIPTION	
CHK		APPRO DATE	
ENGR		TITLE	
PROJ		GPU MICROPROGRAM	
INFO		FLOW CHARTS	
SIGNATURE		SCALE	
DATE		DWG NO. DS21E1065	
REMOVE ALL BURRS AND SHARP EDGES		UNIT	
MANUFACTURED BY		SHEET 3 OF 30 SHEETS	

DS21E1065

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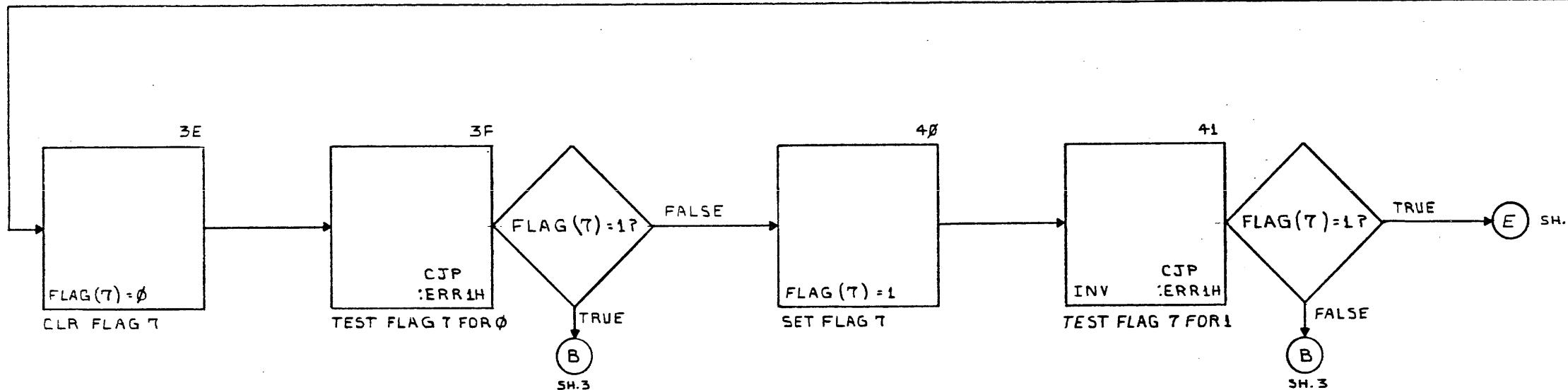
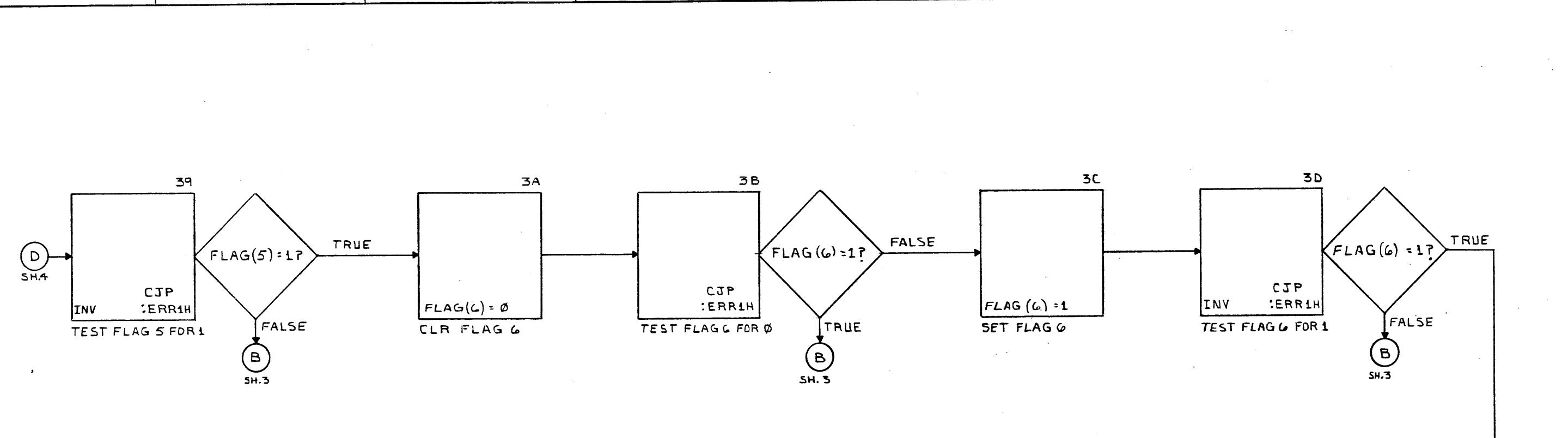
8 7 6 5 4 3 2 1



CONTINUE FLAGS BYTE TEST

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MATERIAL:	DECIMAL				
	XX ± .01				
FINISH:	XXL ± .005				
	XXX ± .010				
PROJ:	FRACTIONAL ± 1/64				
	ANGULAR ± 3°FOO'				
SEE SHEET 1		SYM	REVISION DESCRIPTION	APP DATE	
DRW D.O'Hearn 10-74					
ENGR		TITLE			
PROJ		GPU MICRO PROGRAM FLOW CHARTS			
MFG		SCALE		Dwg No.	DS21E1065
SIGNATURE DATE					
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT.			
					SHEET 4 OF 30 SHEETS

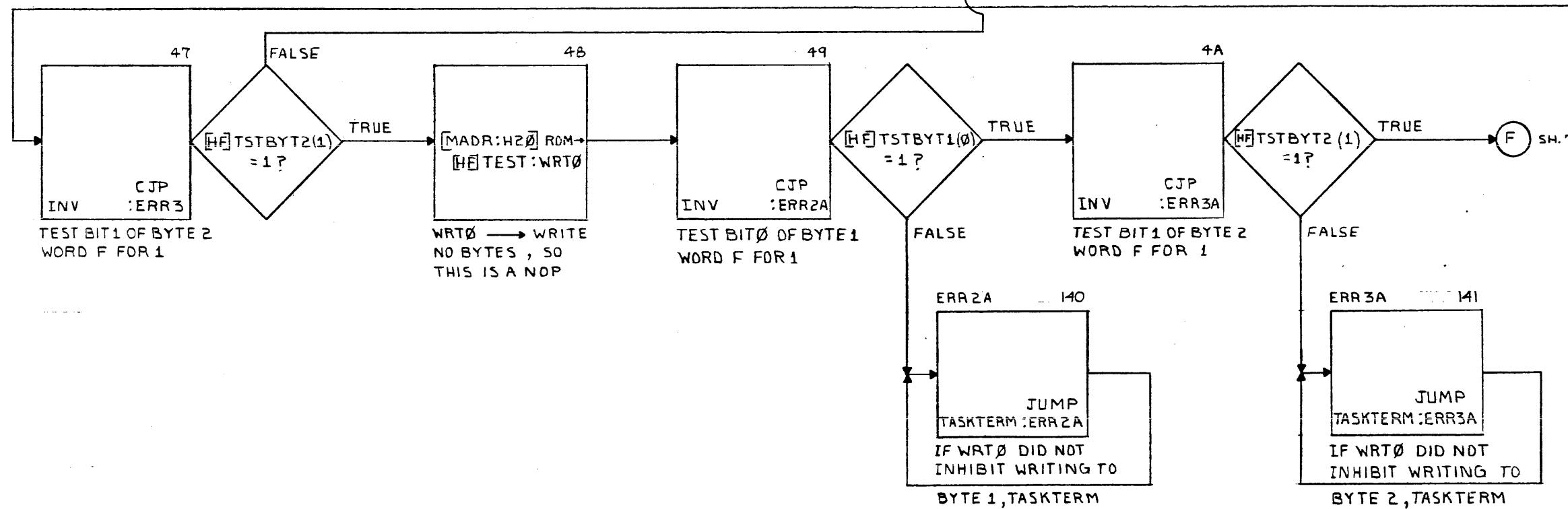
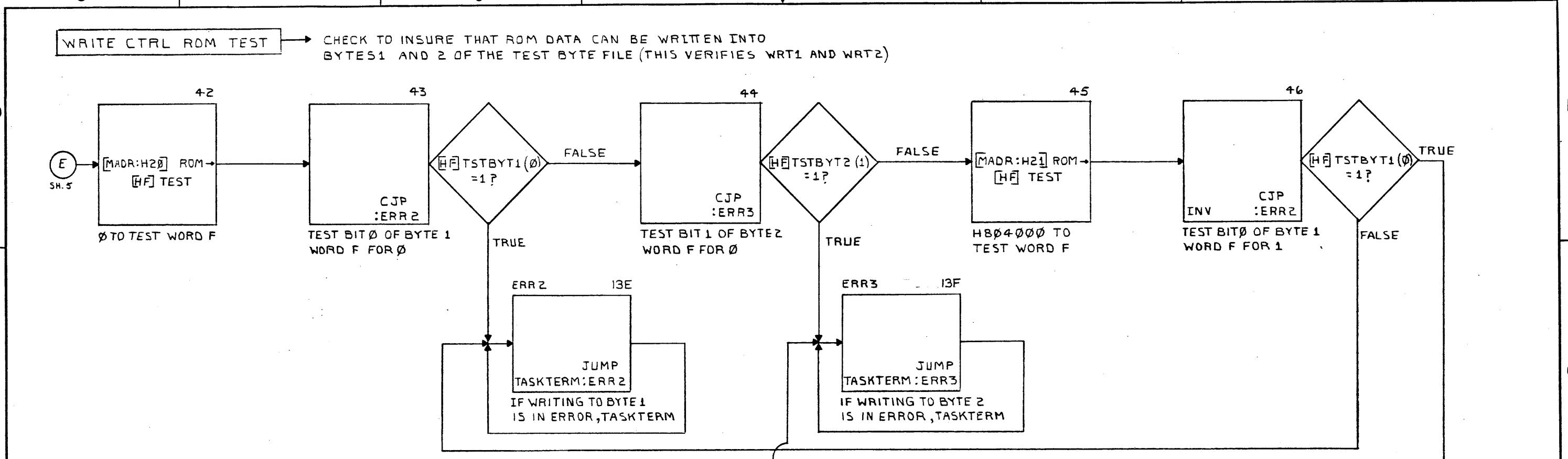
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### FINISH FLAGS BYTE TEST

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MATERIAL:	DECIMAL				
	XX	+.01			
FINISH:	.0000				
	XXX	+.0010			
FRACTIONAL & ANGULAR		+.1/64			
		FOOT			
			DRW D.045000 2-75		
			CHK	SEE SHEET 1	
			ENGR	SYM	REVISION DESCRIPTION APP'DATE
			PROJ	TITLE	
			NP0	GPU MICROPROGRAM FLOW CHARTS	
			NP0	SCALE	
			SIGNATURE DATE	DWG NO. DS21E1065	
			REMOVE ALL BURRS AND SHARP EDGES	UNIT WT.	
				SHEET 5 OF 30 SHEETS	

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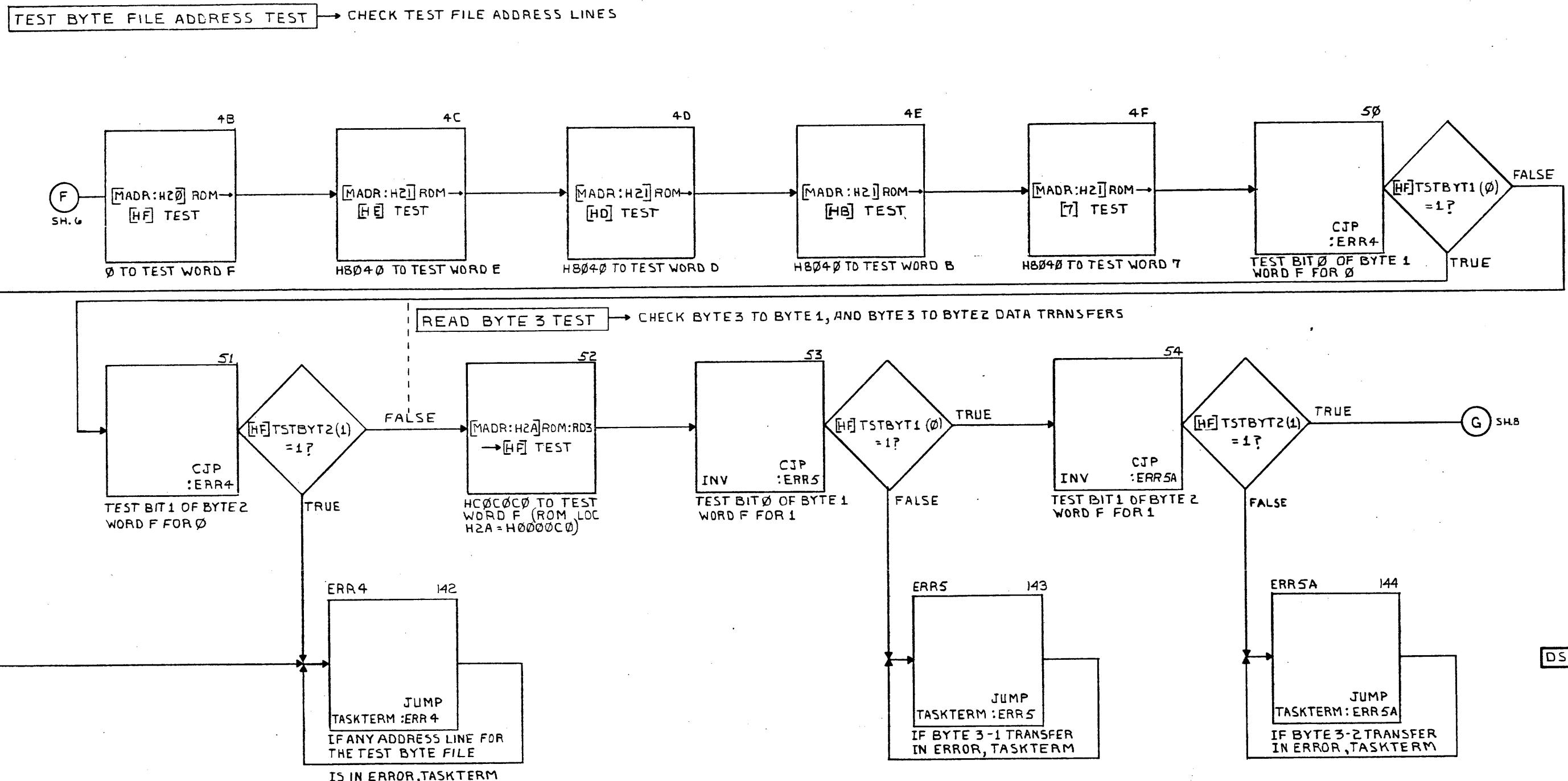


TEST WRITE CTRL ROM BYTES 1 AND 2, SIMULTANEOUSLY, CHECK TEST BYTE FILES

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MATERIAL:	FINISH:	DECIMAL	
		.XX * .01	.XXX * .005
		.XXXX * .0010	
		FRACTIONAL * .0001	
		ANGULAR * .0001	
		DRW 2.0 Hearn 10-79	A SEE SHEET 1
		CHK ENGR PROJ	SYM REV. DESCRIPTION APP'D DATE
		MFG	TITLE GPU MICROPROGRAM FLOW CHARTS
		PART NUMBER	NEXT ASSEMBLY QTY
		SIGNATURE DATE	SCALE
		REMOVE ALL BURRS AND SHARP EDGES	NO. DS21E1065
		UNIT WT.	HEET 6 OF 30 SHEETS

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201 Burlington Road  
Bedford, Massachusetts 01730

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



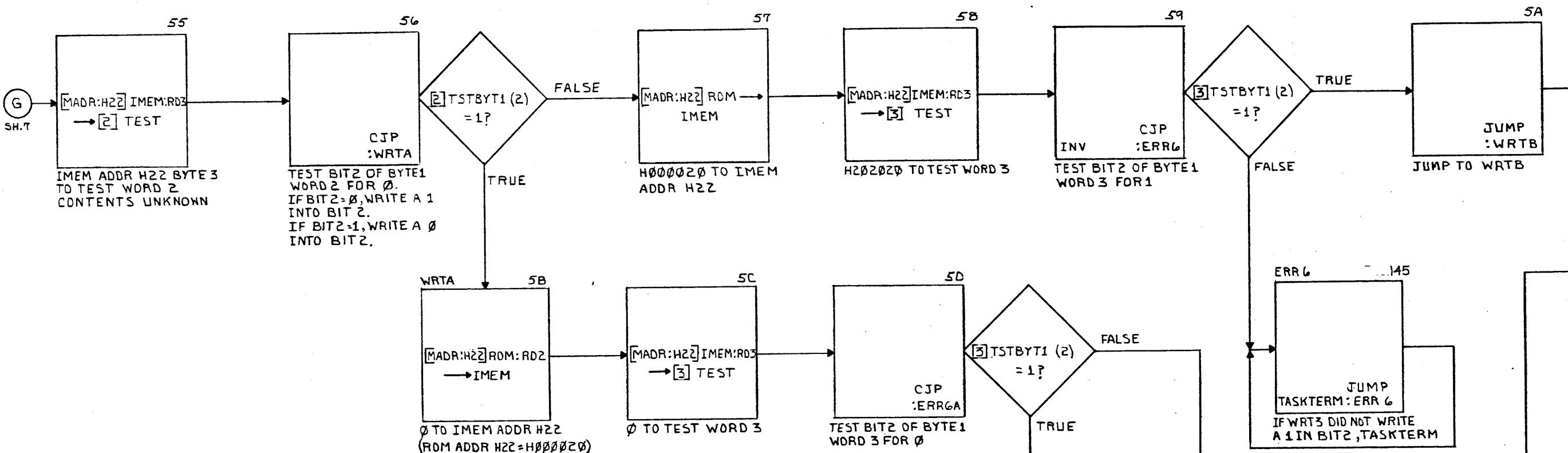
CHECK TEST BYTE FILE ADDRESSING,  
TEST READ CTRL ROM BYTE 3

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERTVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERTVISION CORPORATION.		TOLERANCES	
MATERIAL:	PROJ:	DECIMAL	.XX ± .01
		.XXX ± .005	.XXXX ± .0010
		ANGULAR	± 1°/64
		SYN	SEE SHEET 1
		CHK	REVISION DESCRIPTION APP'DATE
		ENR	TITLE GPU MICROPROGRAM FLOW CHARTS
		PROJ	PART NUMBER NEXT ASSEMBLY QTY
		MFG	SCALE DWG NO. DS21E1065
		SIGNATURE DATE	REMOVED ALL BURRS AND SHARP EDGES UNIT WT. ✓
		REMOVED ALL BURRS AND SHARP EDGES	SHEET 7 OF 30 SHEETS

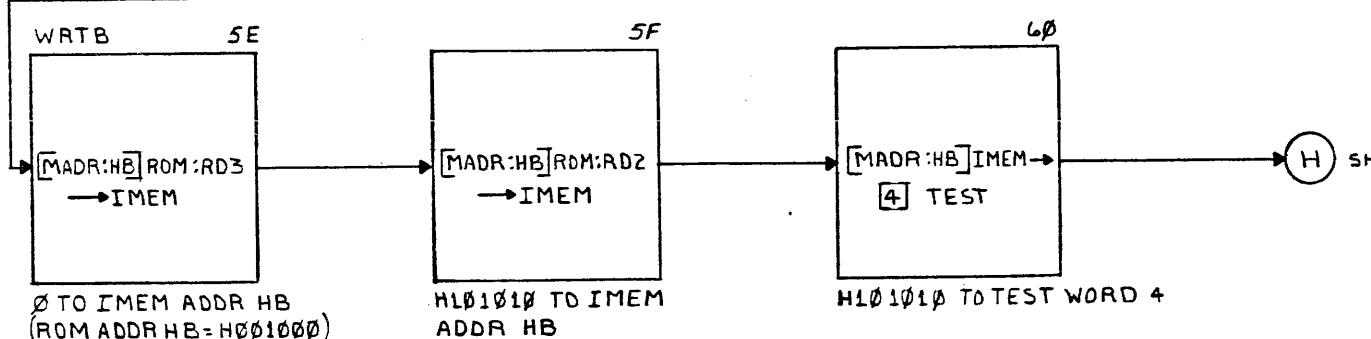
DS21E1065

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

**WRITE CTRL ROM TEST** → CHECK TO INSURE THAT ROM DATA CAN BE WRITTEN INTO BYTE 3 OF THE IMEM (THIS VERIFIES WRT 3)

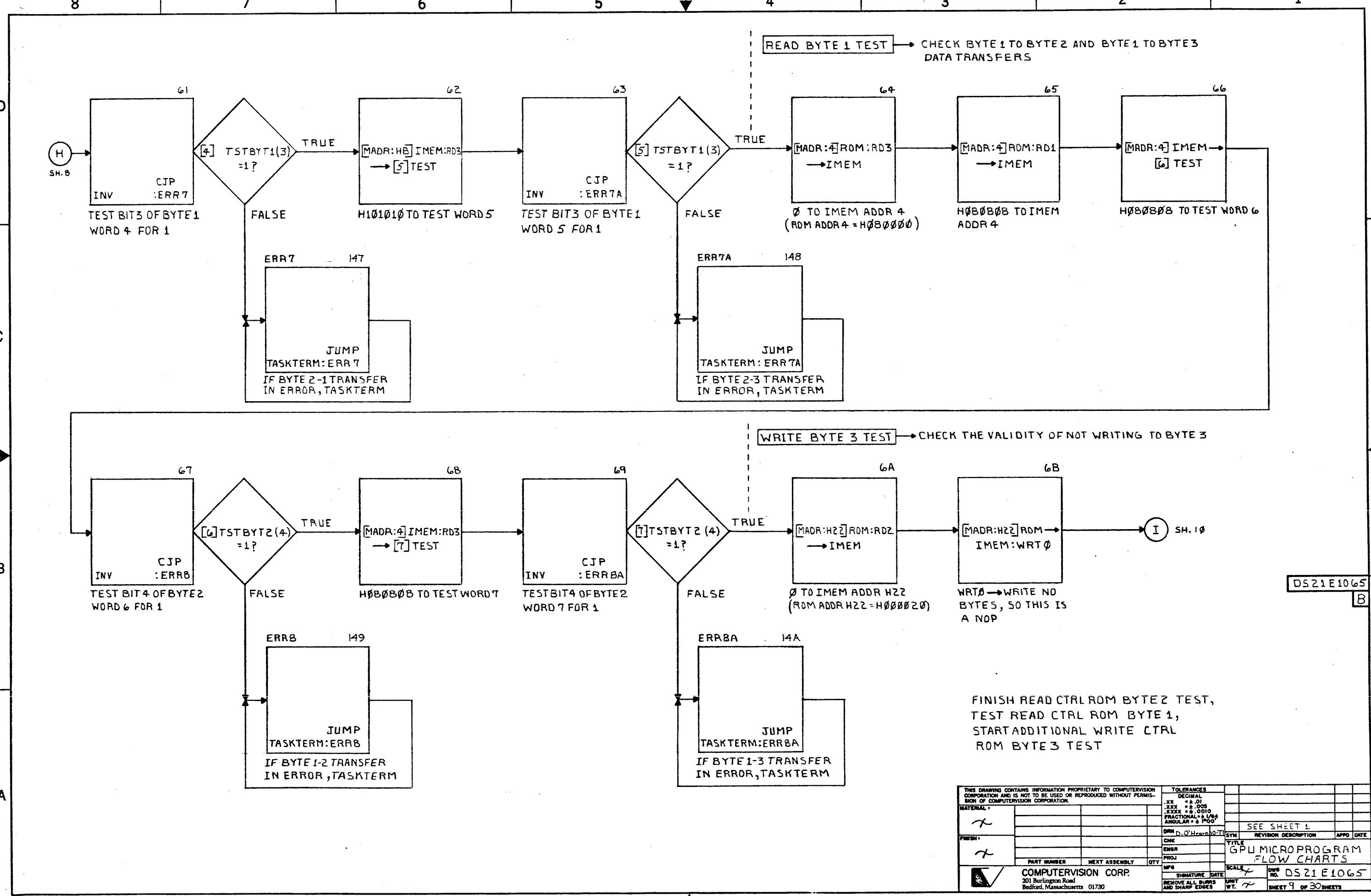


**READ BYTE 2 TEST** → CHECK BYTE2 TO BYTE1 AND BYTE 2 TO BYTE3  
DATA TRANSFERS

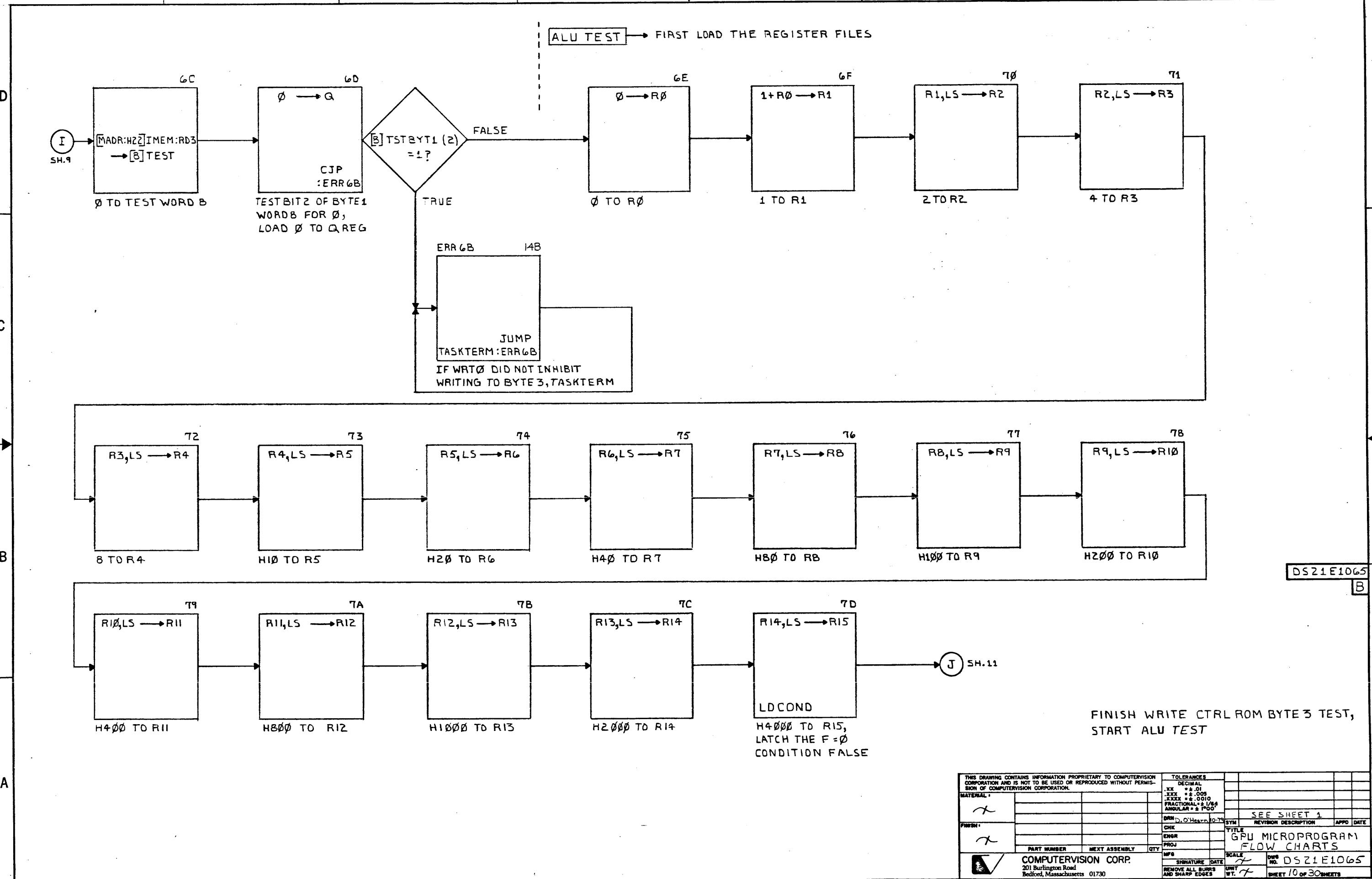


TEST WRITE CTRL ROM BYTE 3,  
START READ CTRL ROM BYTE 2 TEST

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		DECIMAL	
		XX ± .01	
		XXX ± .005	
		XXXX ± .0010	
		FIXTURES ± .0005	
		ANGULAR ± 1°00'	
		DRW D. O'Hearn 10/75	SEE SHEET 1
		CHK	SYM
		ENGR	TITLE
		PROJ	GPU MICROPROGRAM FLOW CHARTS
PART NUMBER		NEXT ASSEMBLY	QTY
COMPUTEVISION CORP.		DS21E1065	
201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE DATE	
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT.	
		SHEET 8 OF 30 SHEETS	

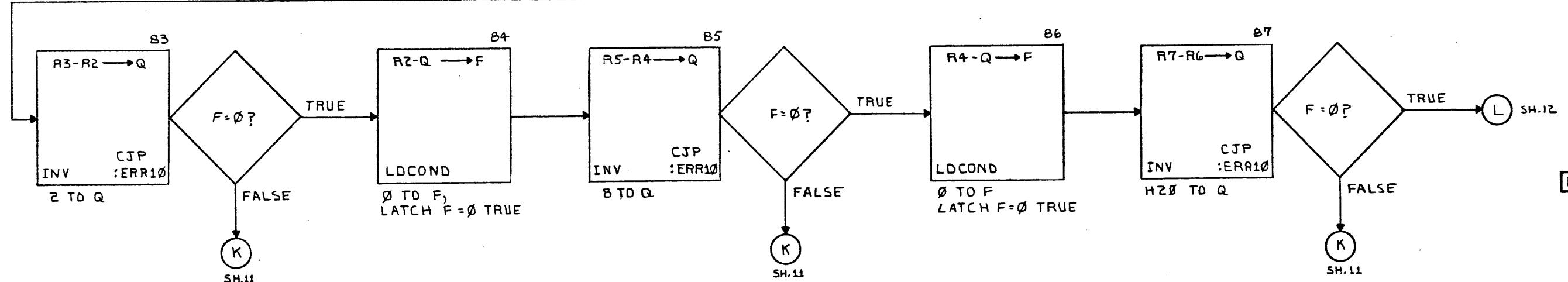
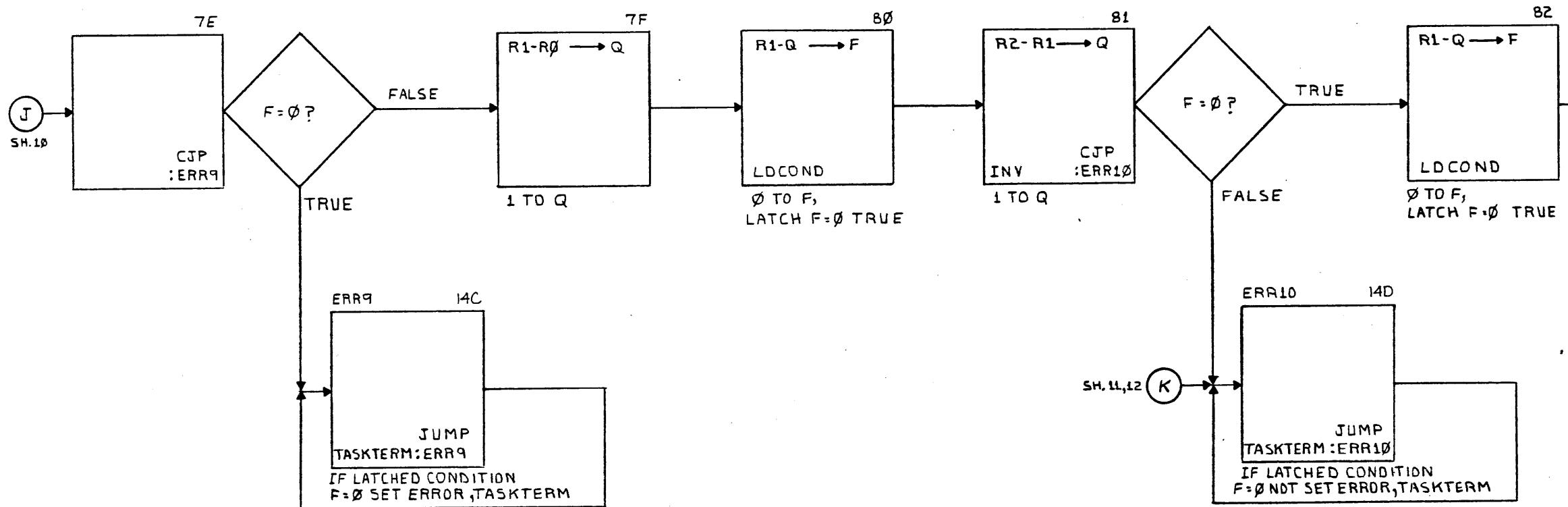


8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



8 7 6 5 4 3 2 1

**ALU TEST** → NOW USE THE REGISTER FILE, Q REG, AND ARITHMETIC SECTION TO CHECK THE ALU OPERATION

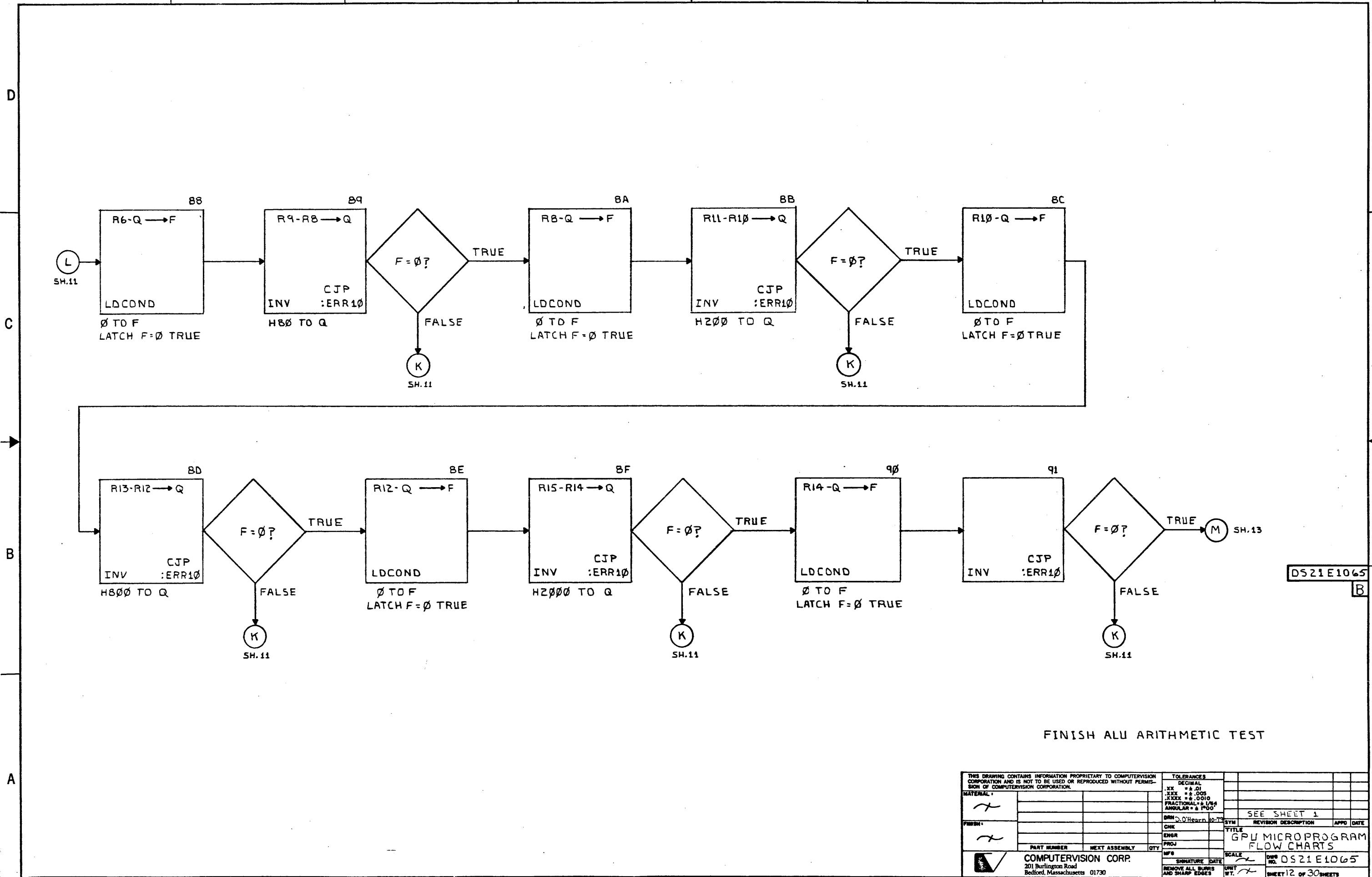


CONTINUE ALU TEST,  
CHECK F=Ø LATCHED CONDITION

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MATERIAL:	DECIMAL		
	.XX	+.01	
PHOTO:	.XXX		
	+.005		
PROJ:	.XXXX		
	+.0010		
DRN D.O'Hearn 10-71		SEE SHEET 1	
CHK		SYM	
ENGR		TITLE	
PROJ		GPUMICRO PROGRAM FLOW CHARTS	
PART NUMBER		NEXT ASSEMBLY	QTY
MFG		SCALE	
SIGNATURE DATE		DWS NO. DS21E1065	
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT.	X
		SHEET 11 OF 30 SHEETS	

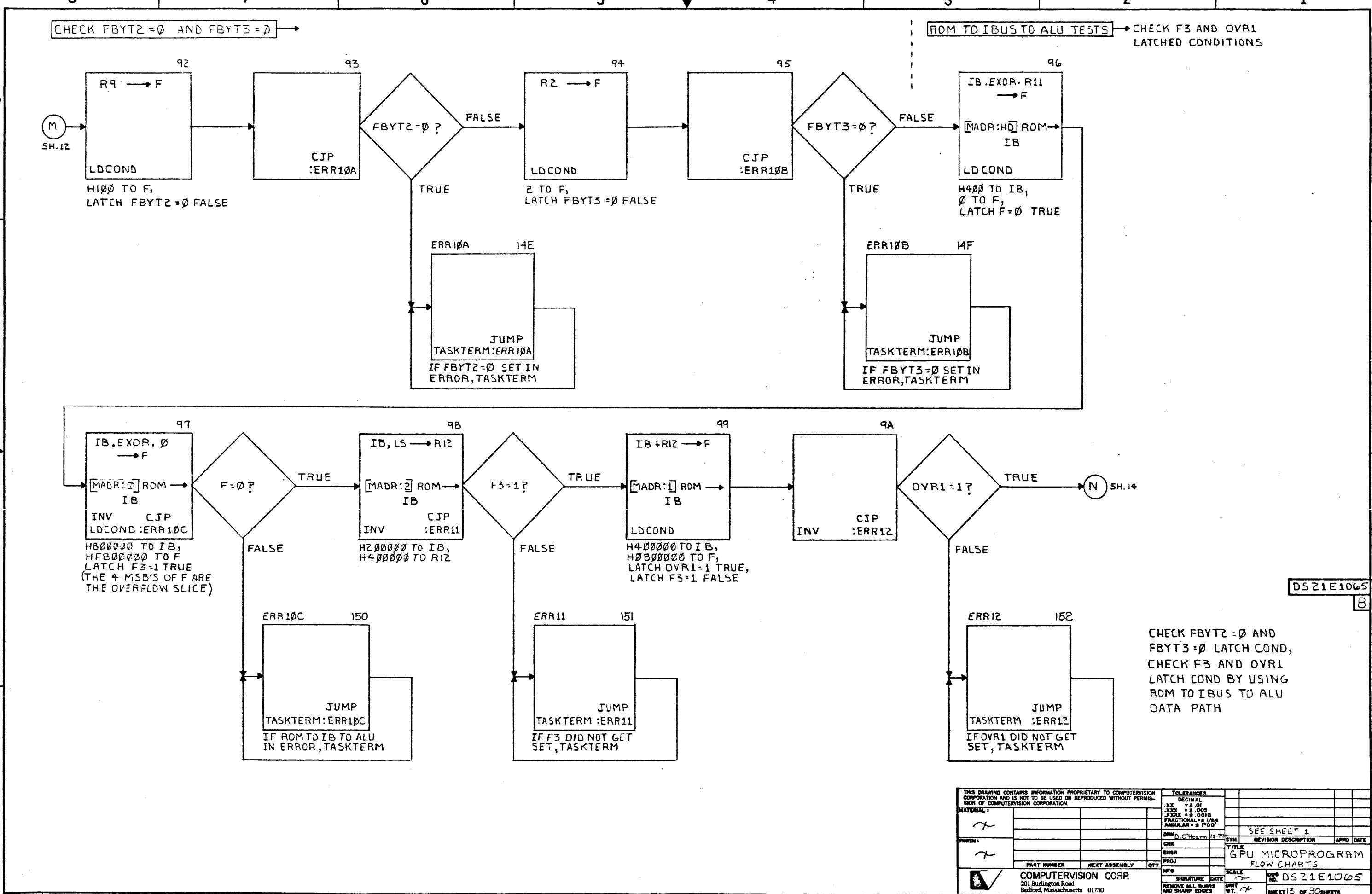
COMPUTERVISION CORP.  
201 Burlington Road  
Bedford, Massachusetts 01730

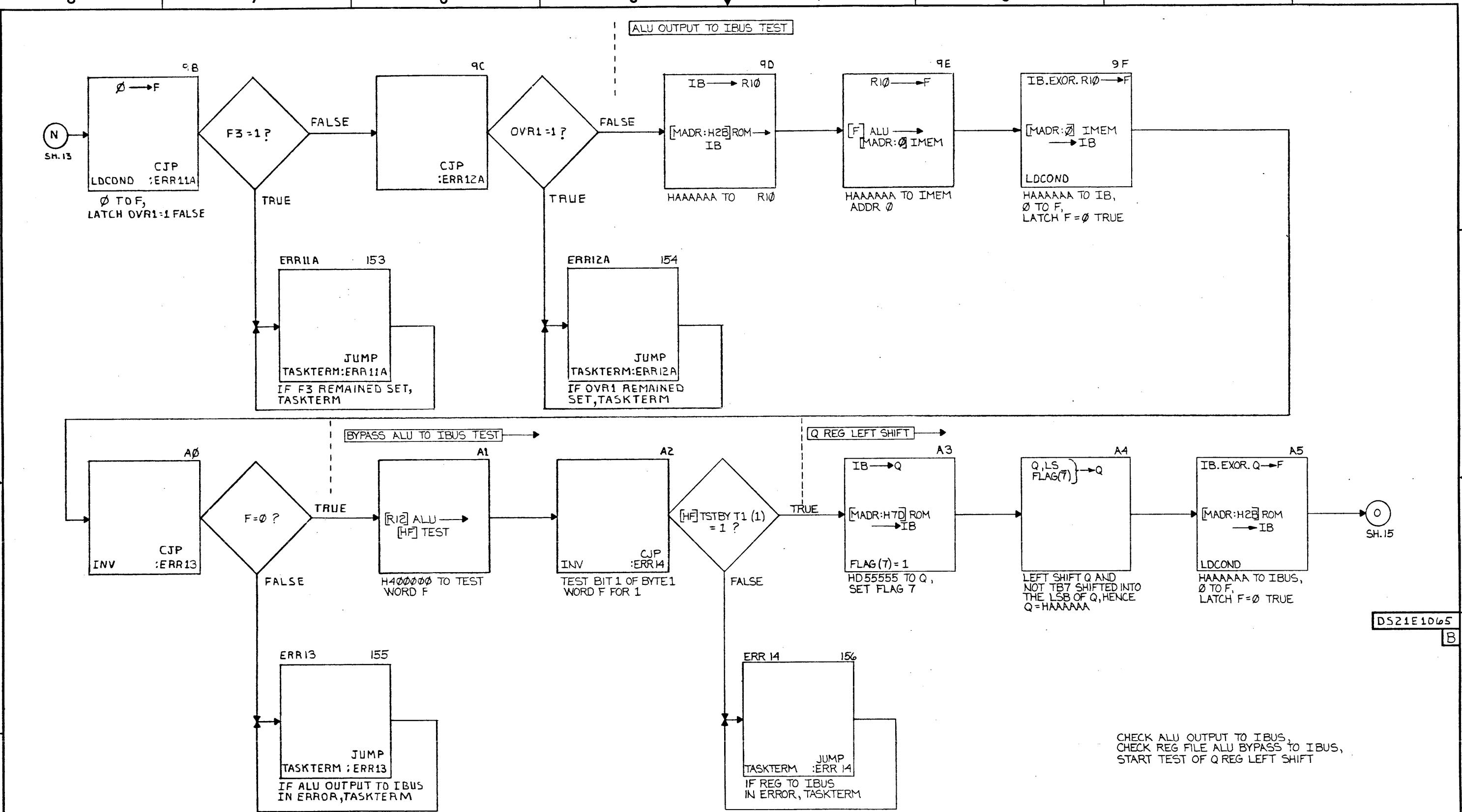
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



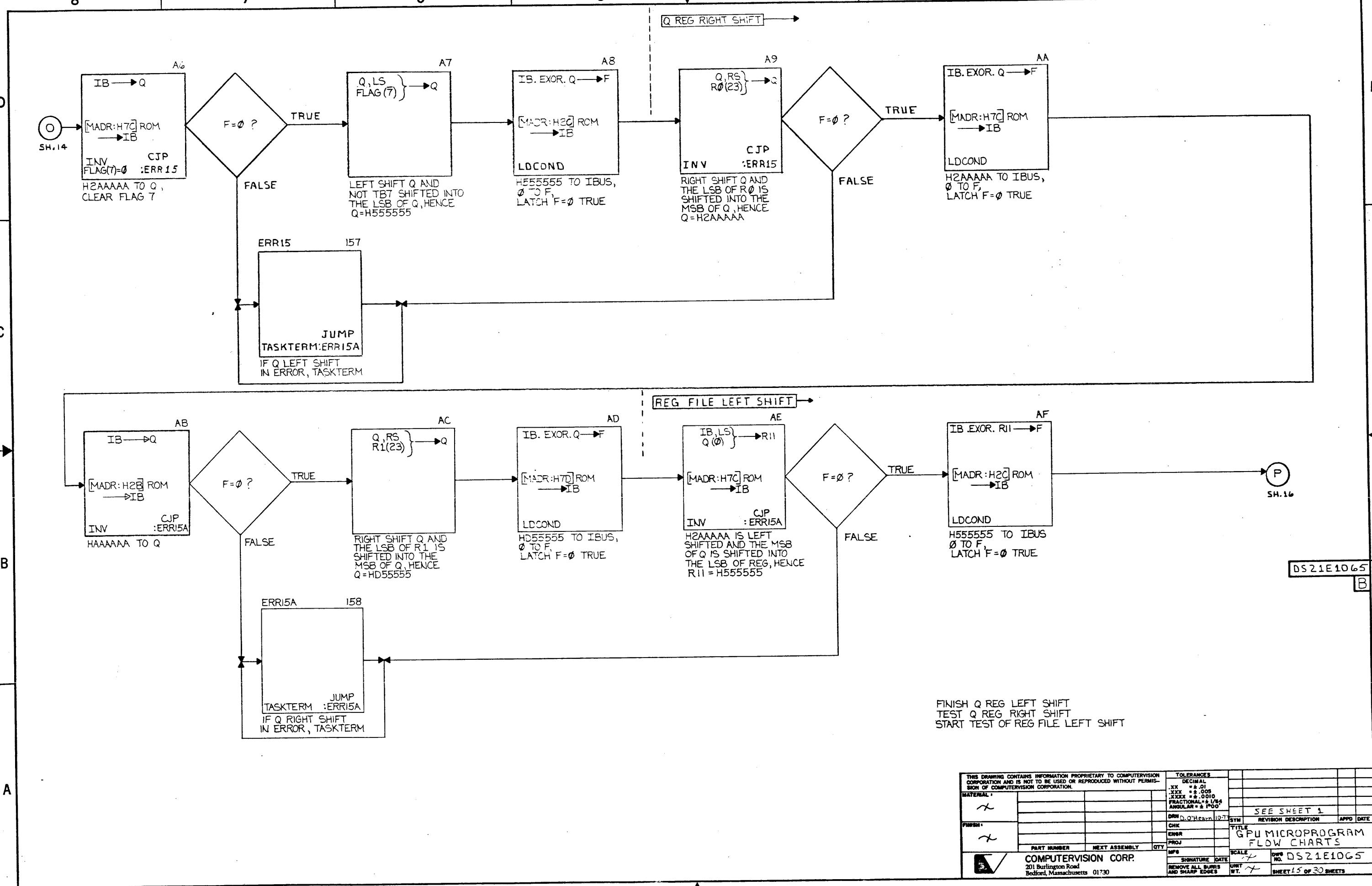
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES			
MATERIAL: <i>✓</i>		DECIMAL			
FINISH: <i>✓</i>		.XX			
PART NUMBER		.XXX			
NEXT ASSEMBLY		.XXXX			
QTY		FRACTIONAL & 1/16			
PROJ:		ANGULAR & 1/16°			
MFG:		SEE SHEET 1			
ENGR:		SYN	REVISION DESCRIPTION APP'D DATE		
CHK:		TITLE GPU MICROPROGRAM FLOW CHARTS			
SIGNATURE DATE		DRAFT NO. DS21E1065			
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT. <i>✓</i>			
SHEET 12 OF 30 SHEETS					

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201 Burlington Road  
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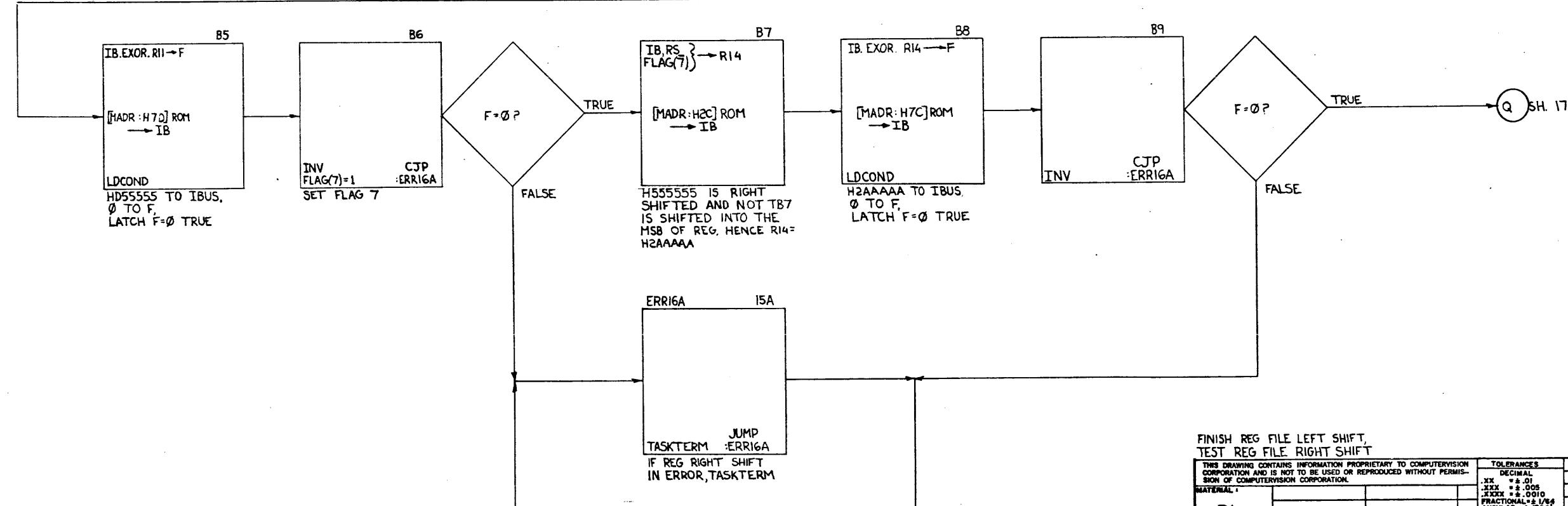
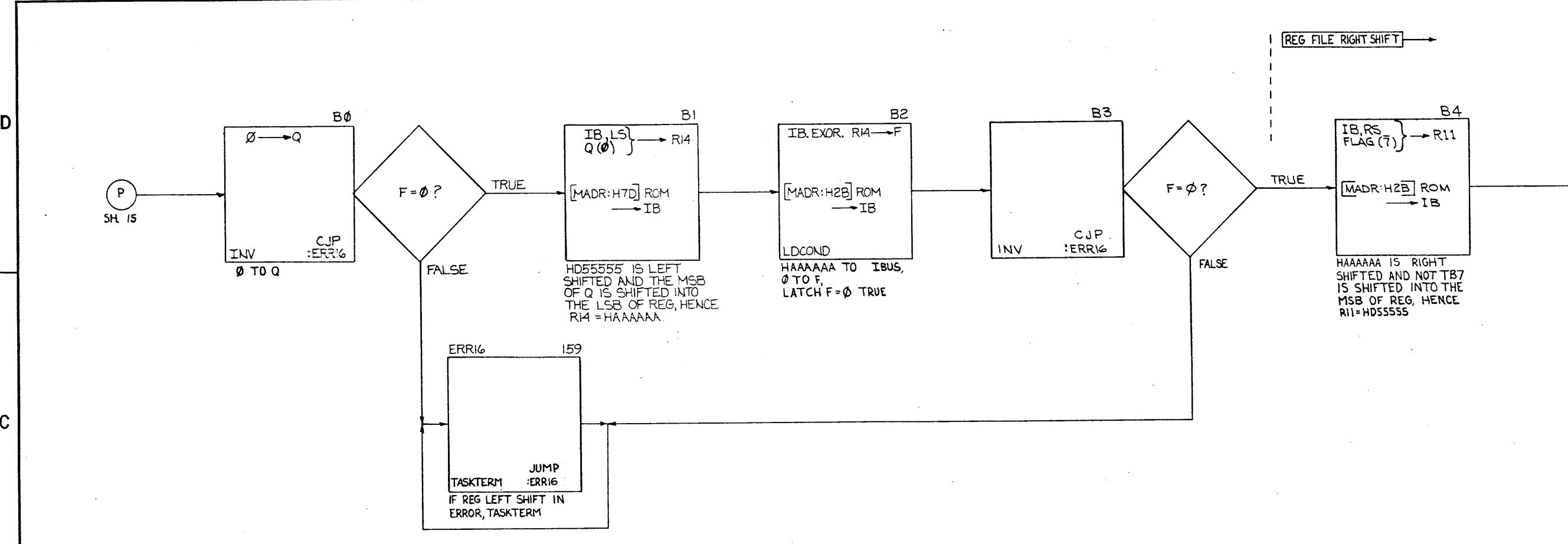




THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES	
MATERIAL:	DECIMAL		
	XX	XXX	XXXX
FINISH:	FRACTIONAL ± .005		
	XX.XX	XXX.XX	XXXX.XX
PROJ:	ANGULAR ± 1°00'		
	XX°XX'	XXX°XXX'	XXXX°XXXX'
SEE SHEET 1		SYM	
REVISION DESCRIPTION		APP'DATE	
ENR		TITLE	
COMPUTEVISION CORP.		GPU MICROPROGRAM FLOW CHARTS	
201 Burlington Road		DWG NO. DS21E1065	
Bedford, Massachusetts 01730		SCALE	
SIGNATURE DATE		UNIT	
REMOVE ALL BURRS AND SHARP EDGES		WT.	
SHEET 14 OF 30 SHEETS			



8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES	
		DECIMAL	
		.XX	+.000
		.XXX	+.0005
		.XXXX	+.0010
		FRACTIONAL = 5/164	
		ANGULAR = 2° 50'	
MATERIAL:		DIM: ROBINSON 9/10	
FINISH:		CHK	SYM
		ENGR	REVISION DESCRIPTION
		PROJ	APP'DATE
PART NUMBER		NEXT ASSEMBLY	QTY
MFG		SCALE	
SIGNATURE DATE		DRAFT NO. DS21E1065	
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT. X	
		SHEET 16 OF 30 SHEETS	

SEE SHEET 1  
TITLE GPU MICROPROGRAM FLOW CHARTS  
COMPUTEVISION CORP.  
201 Burlington Road  
Bedford, Massachusetts 01730

8

7

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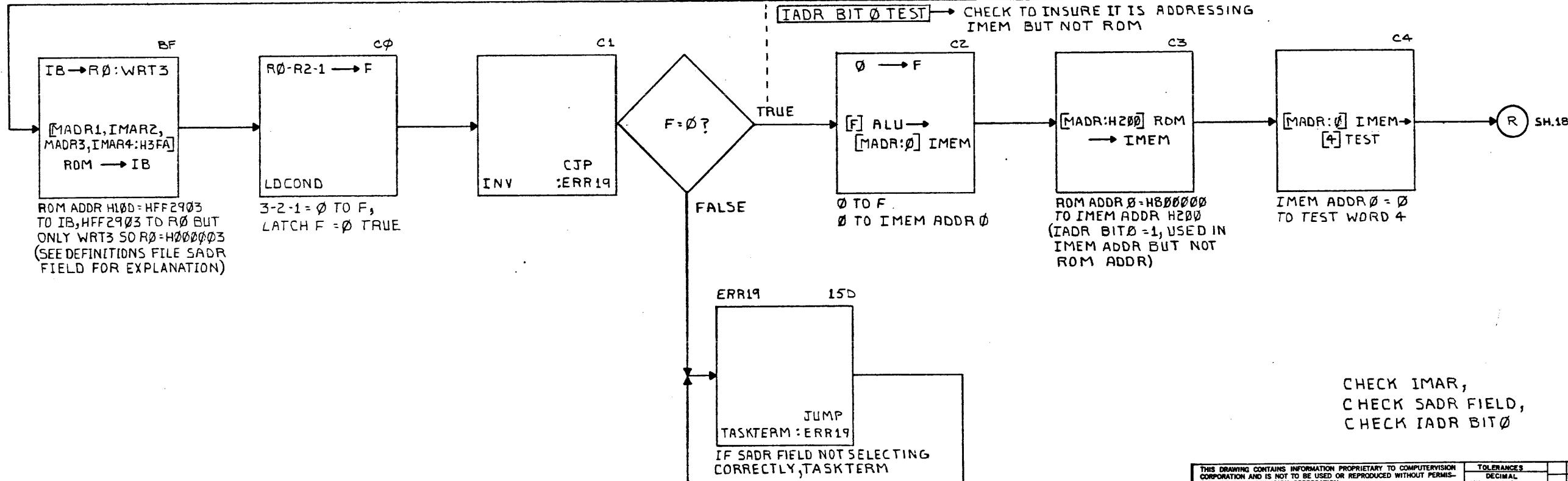
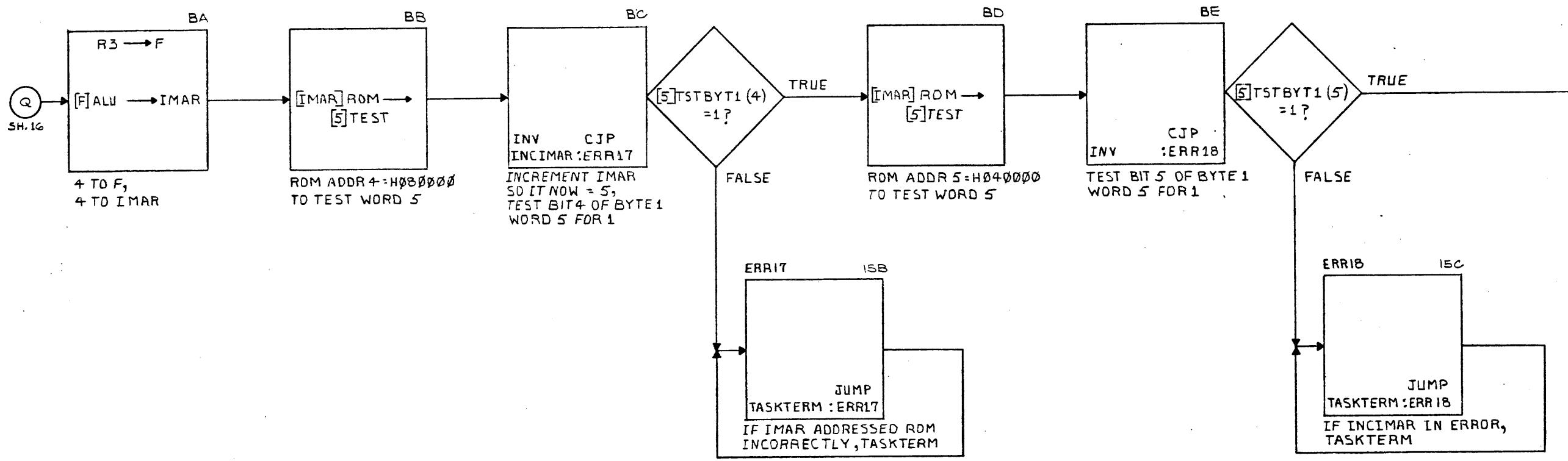
4

3

2

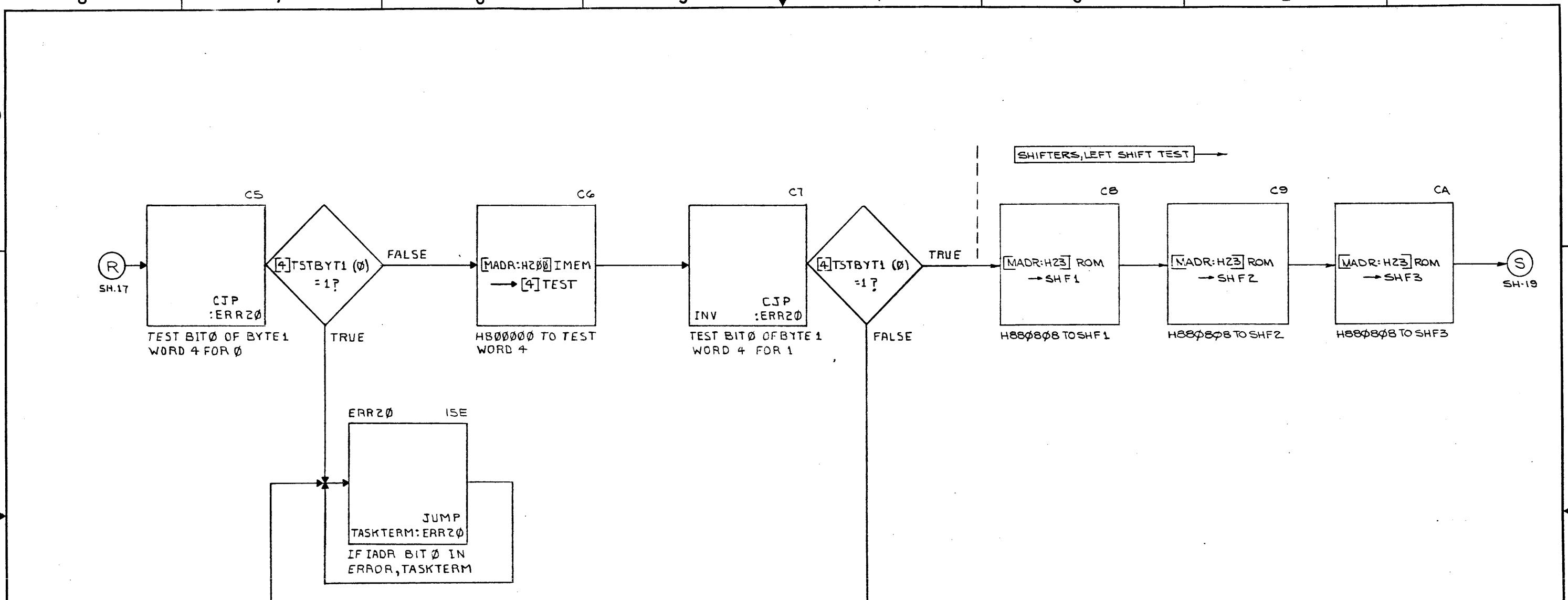
1

**IMAR AND SADR TEST** → LOAD THE IMAR AND ADDRESS THE ROM FROM IT,  
USING THE SADR FIELD SELECT A MADR-IMAR COMBINATION TO ADDRESS THE ROM



CHECK IMAR,  
CHECK SADR FIELD,  
CHECK IADR BITØ

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.	
MATERIAL: ✓	
FINISH: ✓	
PART NUMBER	NEXT ASSEMBLY
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730	
SEE SHEET 1	
TITLE GPU MICROPROGRAM FLOW CHARTS	
DRAWN D.O. Head 10-79	
CHK ENGR PROJ MFG	
SIGNATURE DATE SCALE DWG NO. DS21E1065	
REMOVE ALL BLANKS AND SHARP EDGES UNIT WT. ✓	
SHEET 17 OF 30 SHEETS	



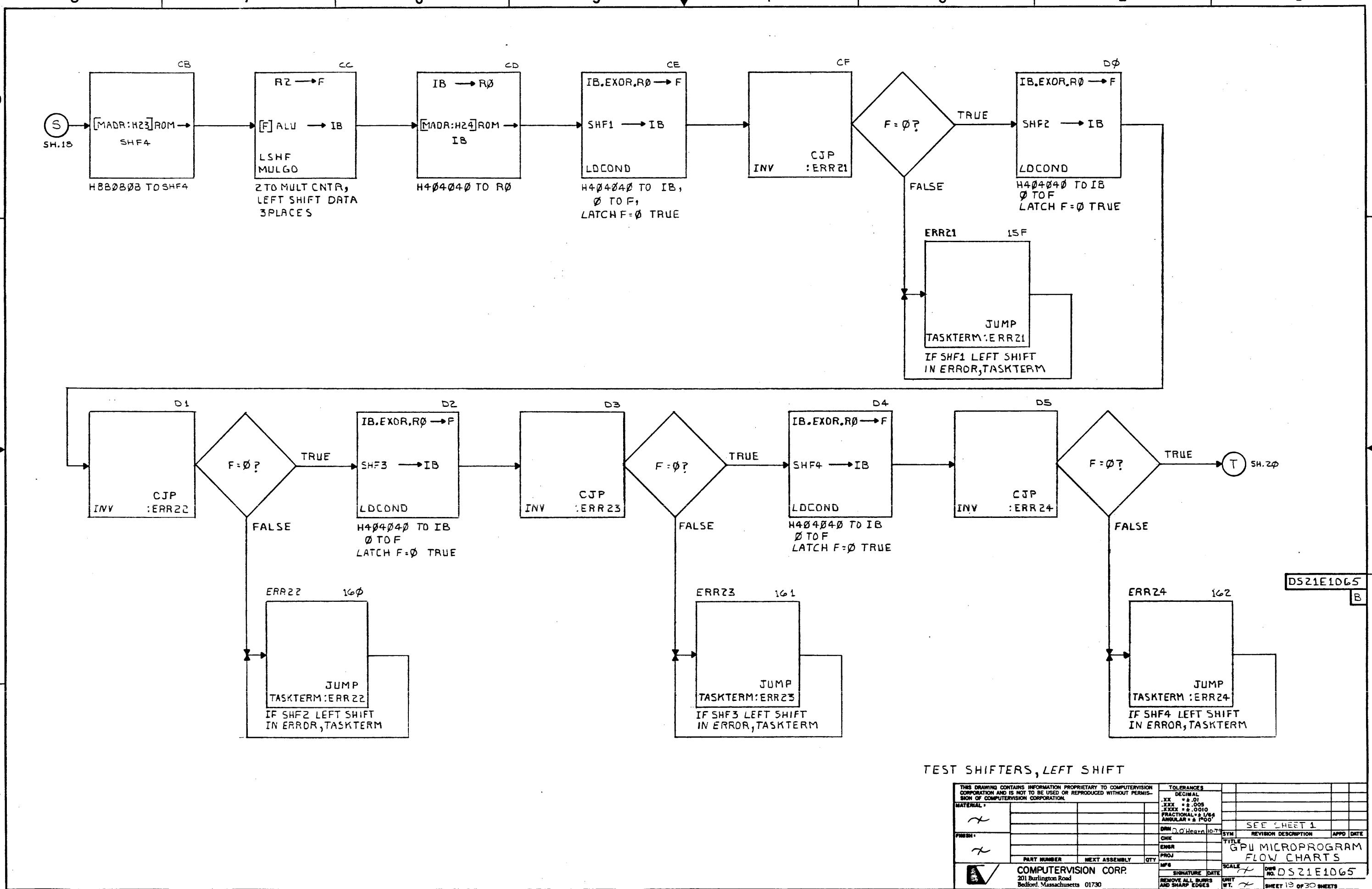
DS21E1065

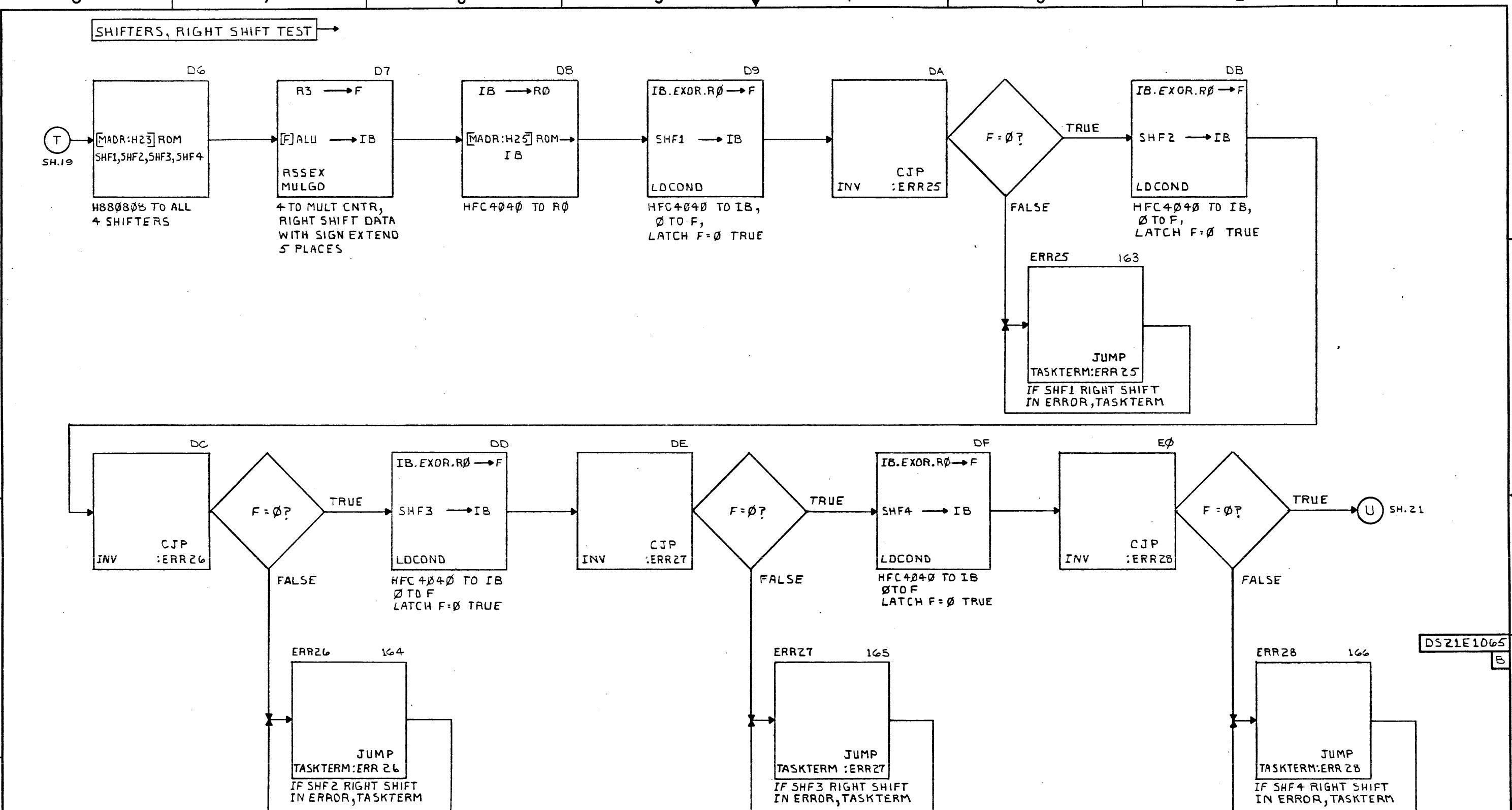
B

FINISH IADR BIT 0 TEST  
START SHIFTER LEFT SHIFT TEST

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES	
MATERIAL: ✓	DECIMAL		
	.XX	.0000	.XXXX
FINISH: ✓	FRACTIONAL ± .1/64		
	ANGULAR ± 1°00'		
DRAWN D.O'Hearn 10-75		SEE SHEET 1	
CHK ✓		SYM	REVISION DESCRIPTION APP'D DATE
ENGR		TITLE	
PROJ		GPU MICROPROGRAM FLOW CHARTS	
MFG		DS NO. DS21E1065	
SIGNATURE DATE		SCALE	
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT. ✓	
		SHEET 18 OF 30 SHEETS	

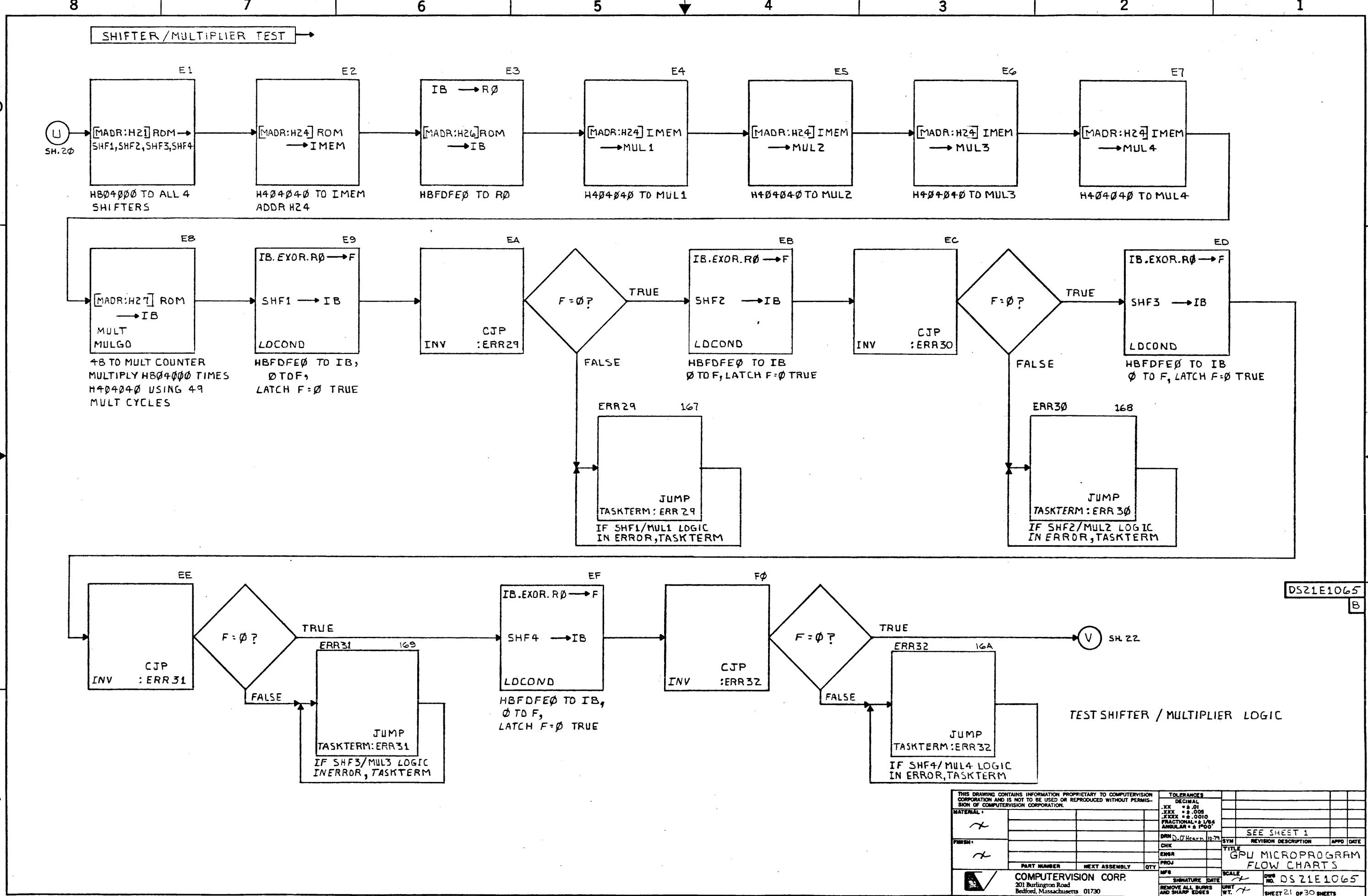
COMPUTEVISION CORP.  
201 Burlington Road  
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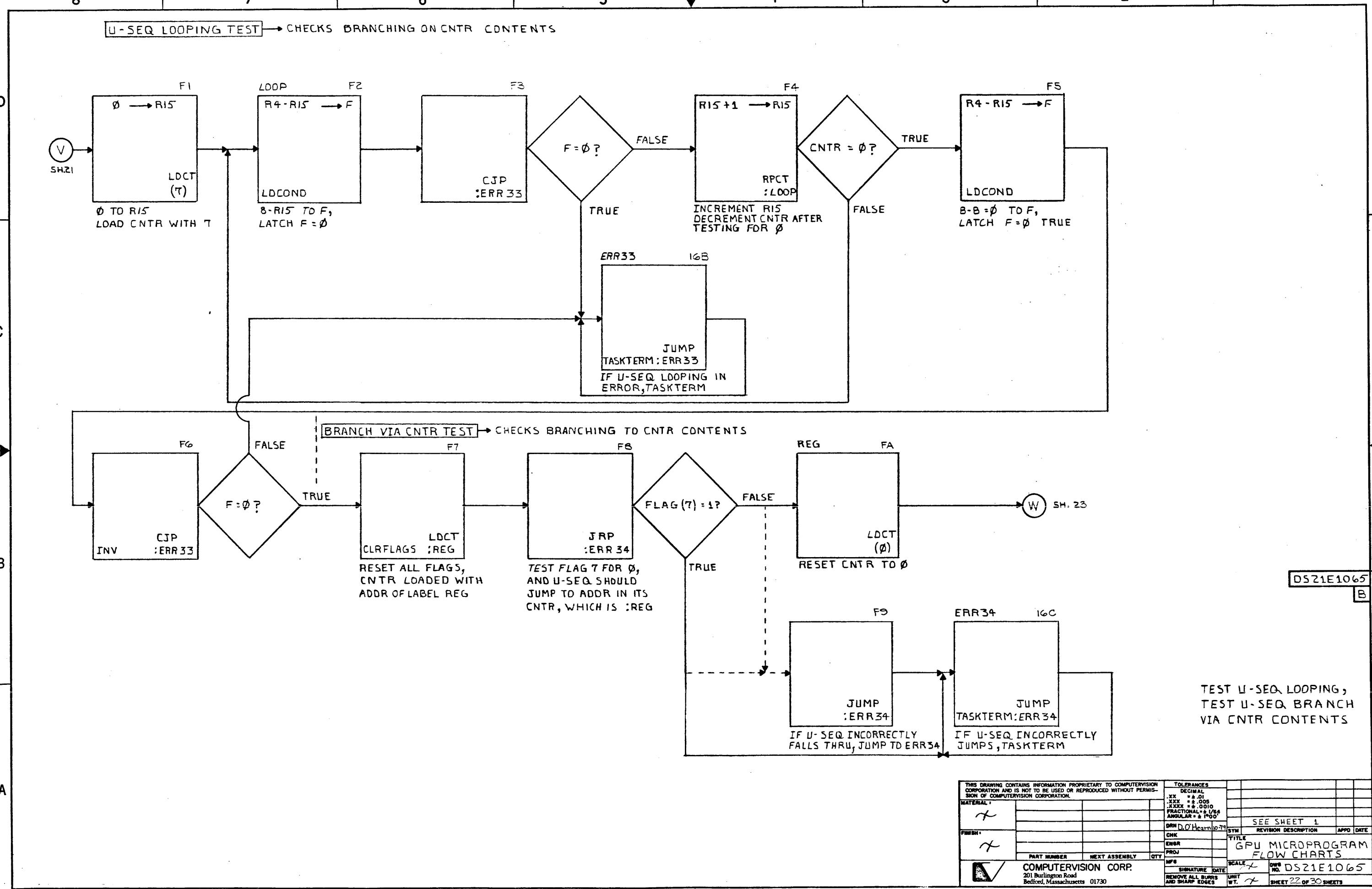




## TEST SHIFTERS, RIGHT SHIFT WITH SIGN EXTEND

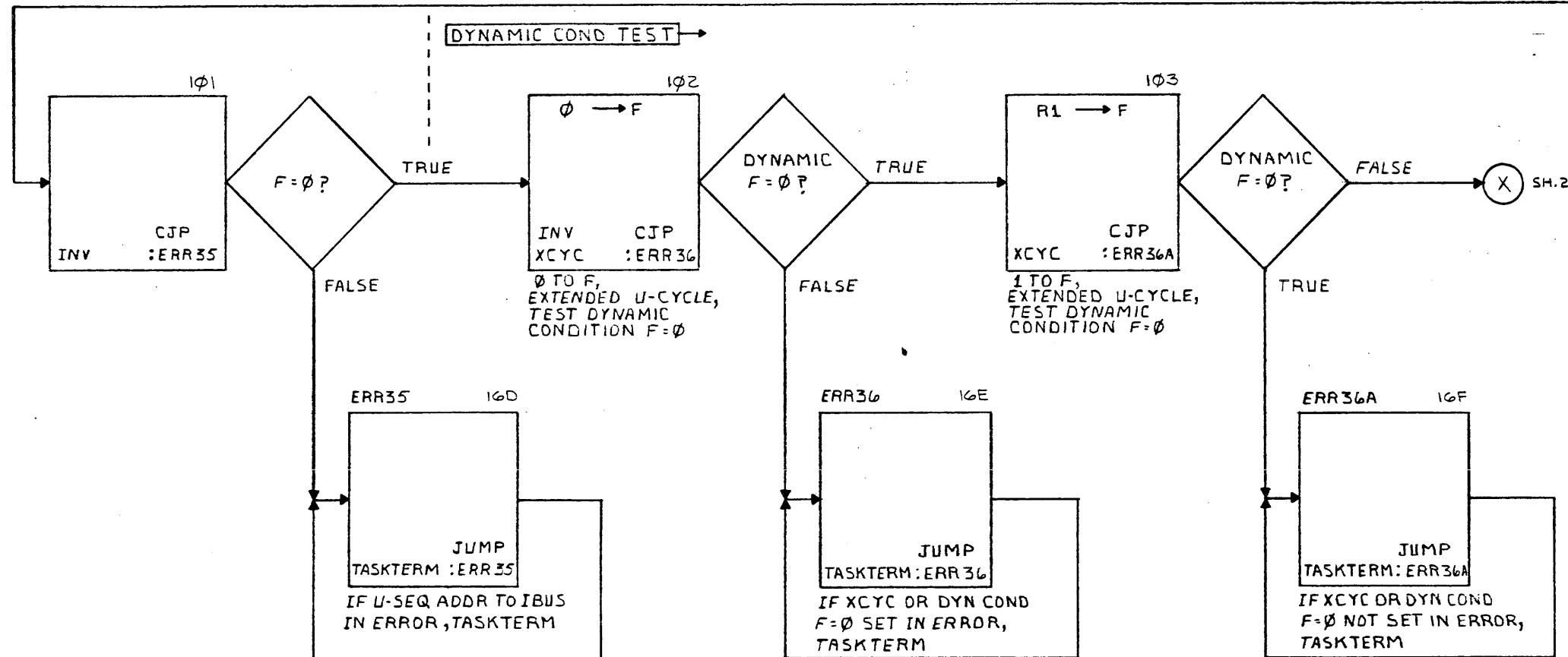
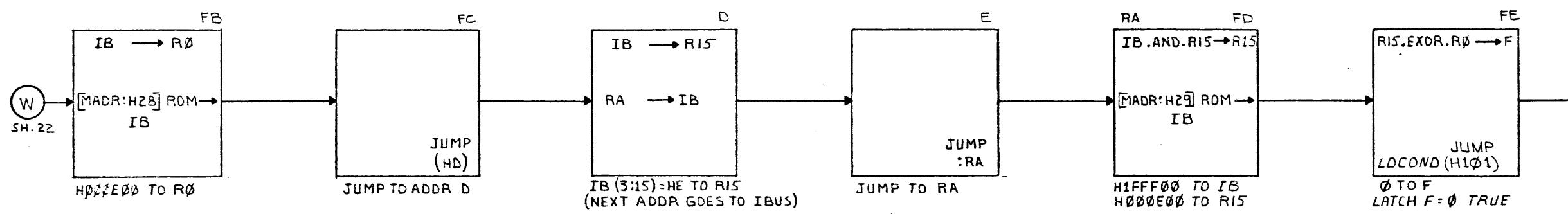
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.			TOLERANCES			
MATERIAL:	X		DECIMAL			
			XX = ± .01 XXX = ± .005 XXXX = ± .0010 FRACTIONAL = 1/64 ANGULAR = ± 1°00'			
FINISH:	X	DRN D.O.Hearn 10-70	SEE SHEET 1	STM	REVISION DESCRIPTION	APPO DATE
		CHK	TITLE GPU MICROPROGRAM FLOW CHARTS			
		ENGR				
		PROJ				
PART NUMBER	NEXT ASSEMBLY	QTY	MFG	SCALE	DRAWING NO.	DS21E1065
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SIGNATURE	DATE		
			REMOVE ALL BURRS AND SHARP EDGES		UNIT	WT.
					SHEET 28 OF 22 SHEETS	





8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

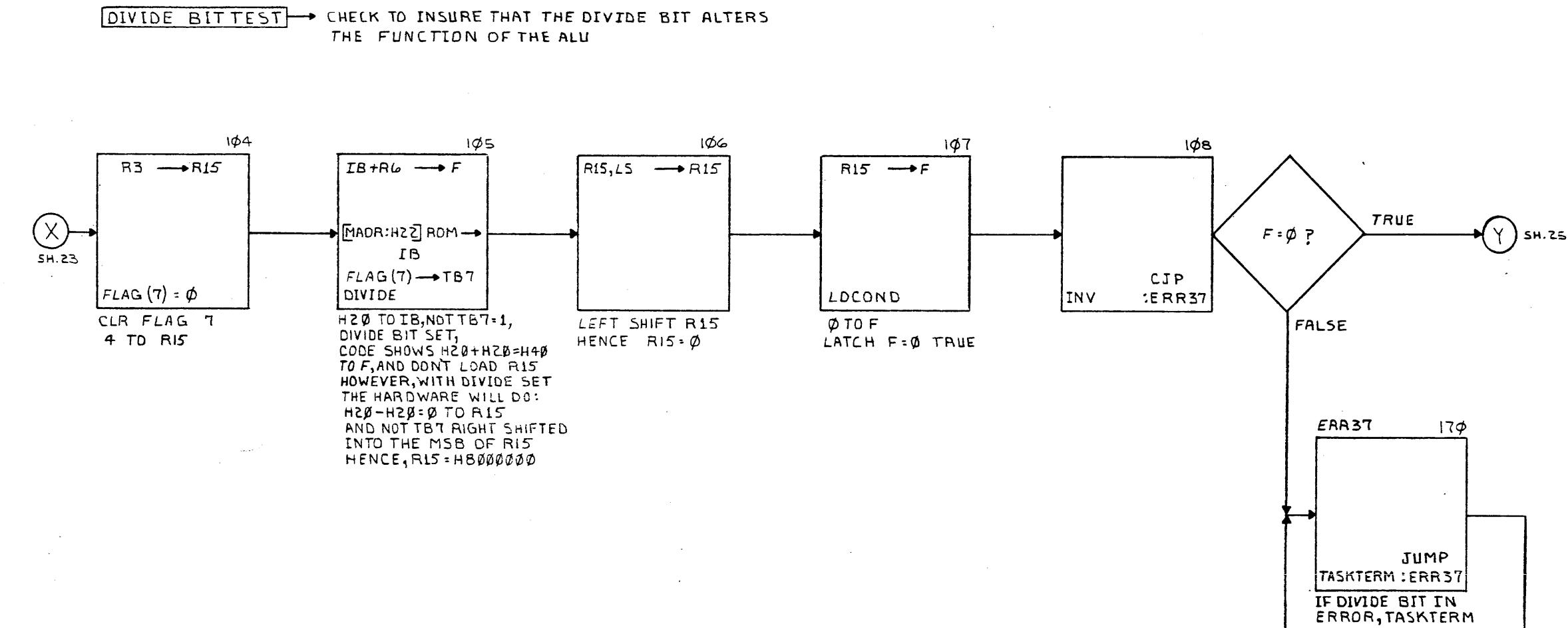
**U-SEQ ADDR TO IBUS** → READ NEXT ADDR ONTO IBUS



CHECK READING U-SEQ ADDRESS  
ONTO IBUS,  
CHECK DYNAMIC CONDITIONS BYTE  
F=Ø CONDITION

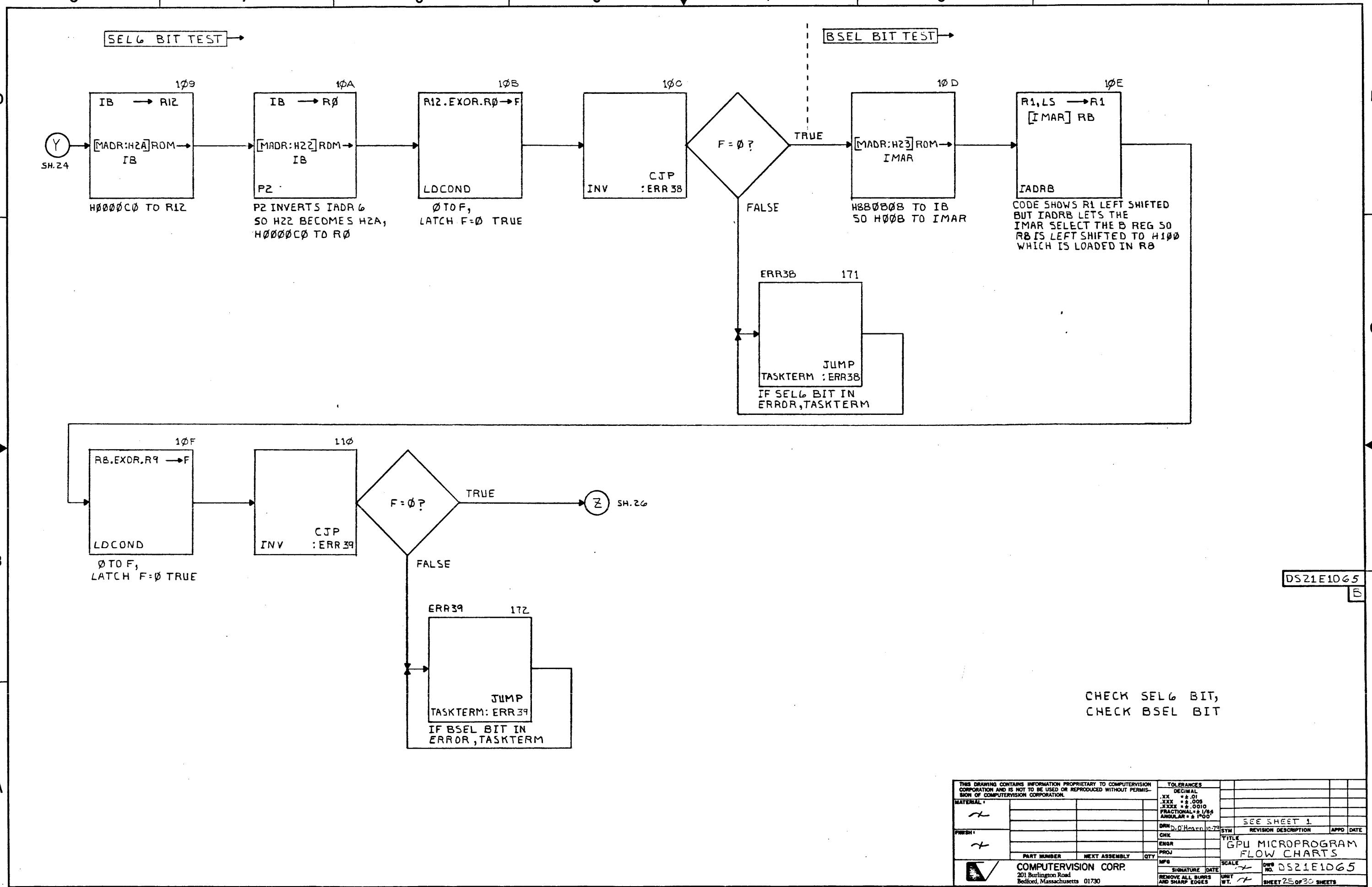
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERTVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERTVISION CORPORATION.		TOLERANCES	
DECIMAL .XX ± .01 .XXX ± .005 .XXXX ± .0010 FRACTIONAL ± 1/64 ANGULAR ± 1°00'			
MATERIAL:  FINISH:  PART NUMBER:	DRAWN BY: D.O'Hearn 10/79		SEE SHEET 1 SYM TITLE PROJ MFG SCALE SIGNATURE DATE REMOVE ALL BURRS AND SHARP EDGES UNIT WT. DRAFT NO. DS21E1065
	CHK ENGR PROJ MFG SCALE SIGNATURE DATE REMOVE ALL BURRS AND SHARP EDGES UNIT WT. DRAFT NO. DS21E1065		
COMPUTERTVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		DS21E1065	

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



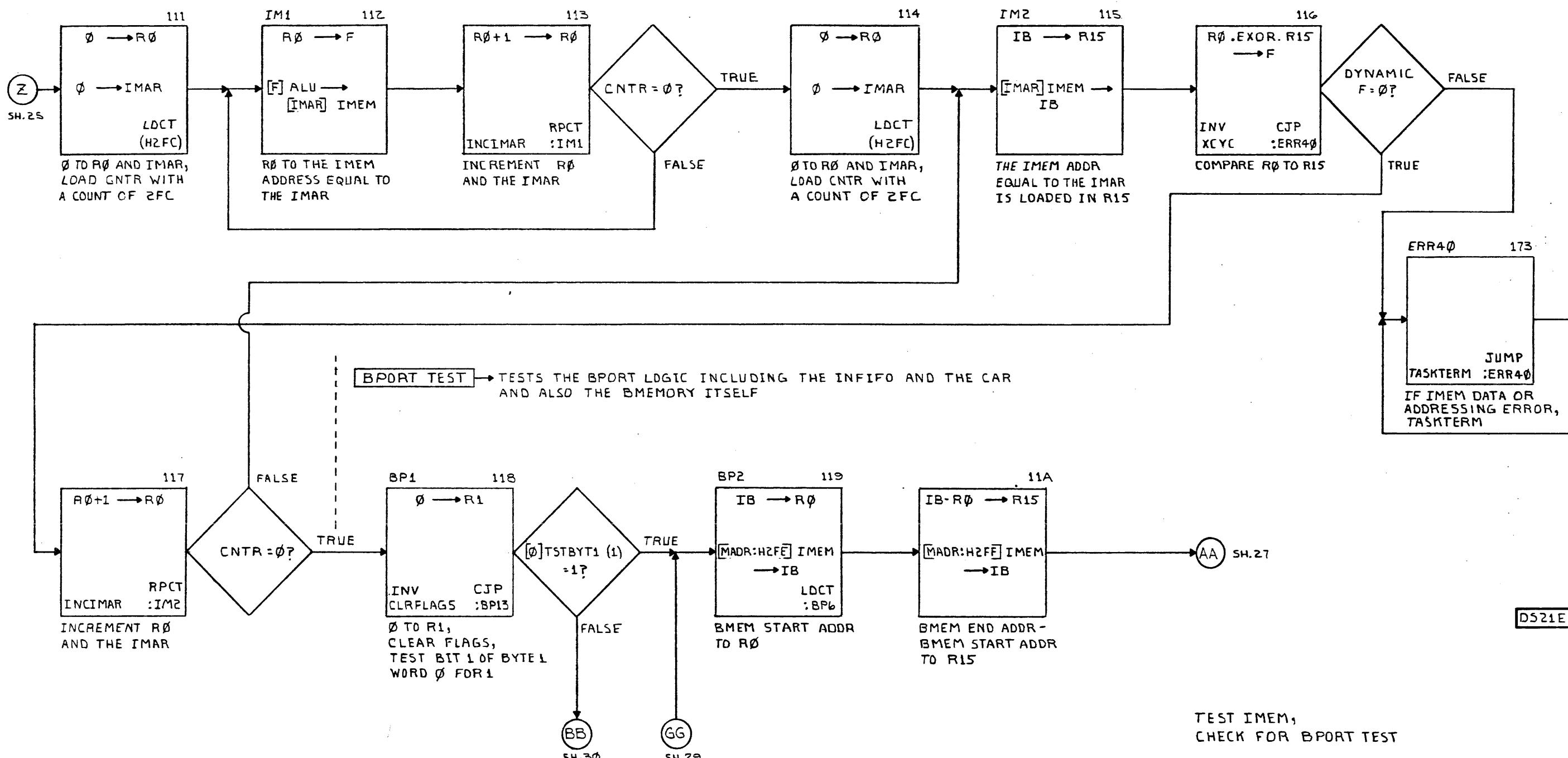
CHECK DIVIDE BIT

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.					
MATERIAL:	TOLERANCES:				
	DECIMAL .XX $\pm .01$	.XXX $\pm .005$	.XXXX $\pm .001$	FRACTIONAL $\pm 1/16$	ANGULAR $\pm 1^{\circ}00'$
FINISH:	SEE SHEET 1				
	DRW 0.0 Hearn 10-73	SYM	REVISION DESCRIPTION	APPRO DATE	
ENGR:	TITLE: GPU MICROPROGRAM FLOW CHARTS				
	PROJ	MPG	SCALE	DWS NO.	
PART NUMBER		NEXT ASSEMBLY	QTY		
COMPUTEVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE	DATE	DS21E1065	
REMOVE ALL BURRS AND SHARP EDGES UNIT WT. ✓					
SHEET 24 OF 30 SHEETS					



8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

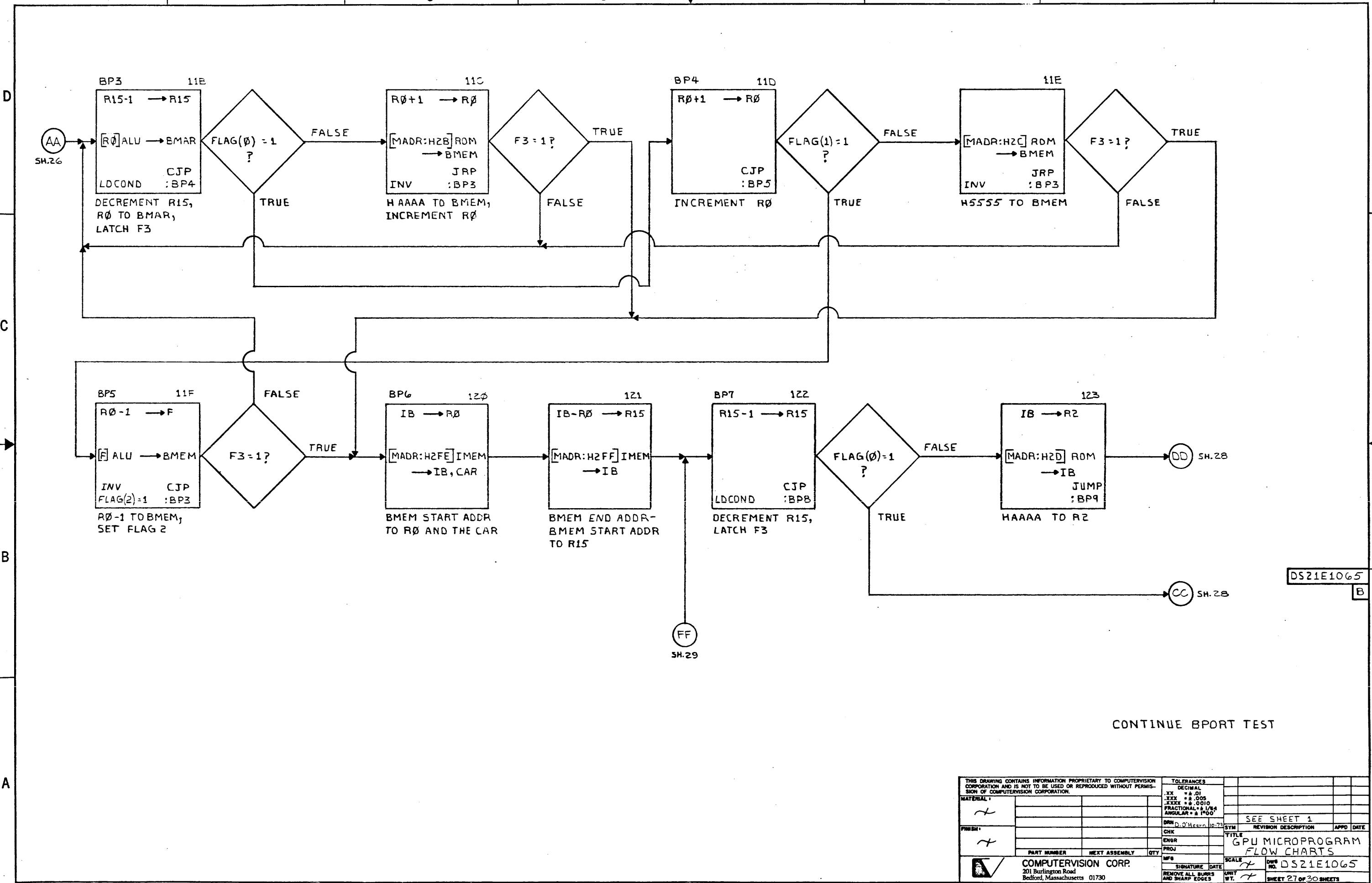
**IMEM TEST** → TEST THE IMEM BY WRITING EACH ADDRESS WITH DATA EQUAL TO ITS OWN ADDRESS

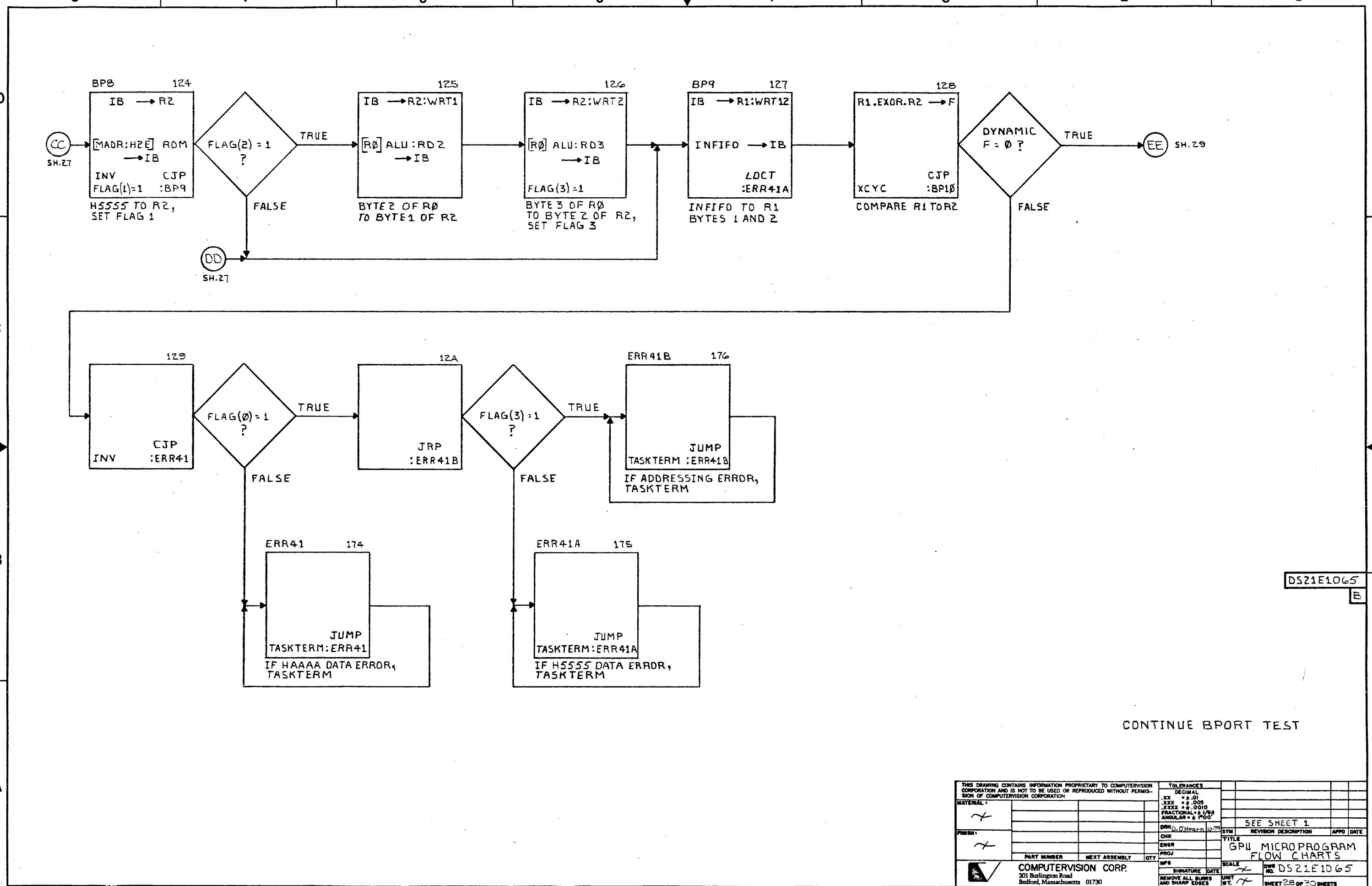


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MATERIAL:	DECIMAL		
	.XX	= .01	.XXX
FINISH:	.XXXX		
	.0000	.0001	.0002
FRACTIONAL ± 1/64		ANGULAR ± 1°00'	
SEE SHEET 1		TITLE	
DRW 3.0 Rev A 073		GPU MICROPROGRAM FLOW CHARTS	
CHK		SYM	
ENGR		REVISION DESCRIPTION APP'DATE	
PROJ			
MFG			
SIGNATURE DATE		SCALE	
REMOVE ALL BURRS AND SHARP EDGES		DRAW. NO. DS21E1065	
		SHEET 26 OF 30 SHEETS	

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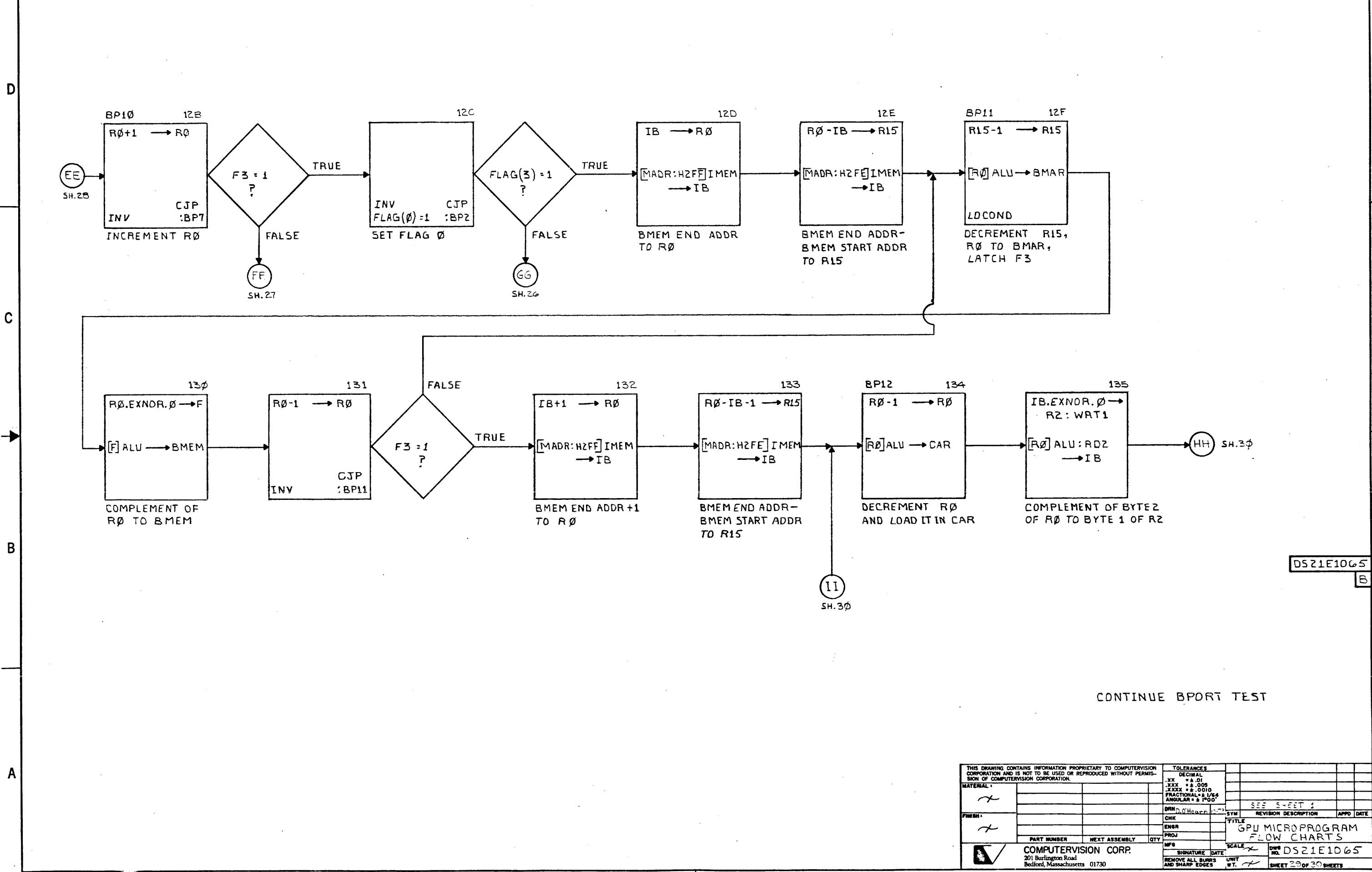
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



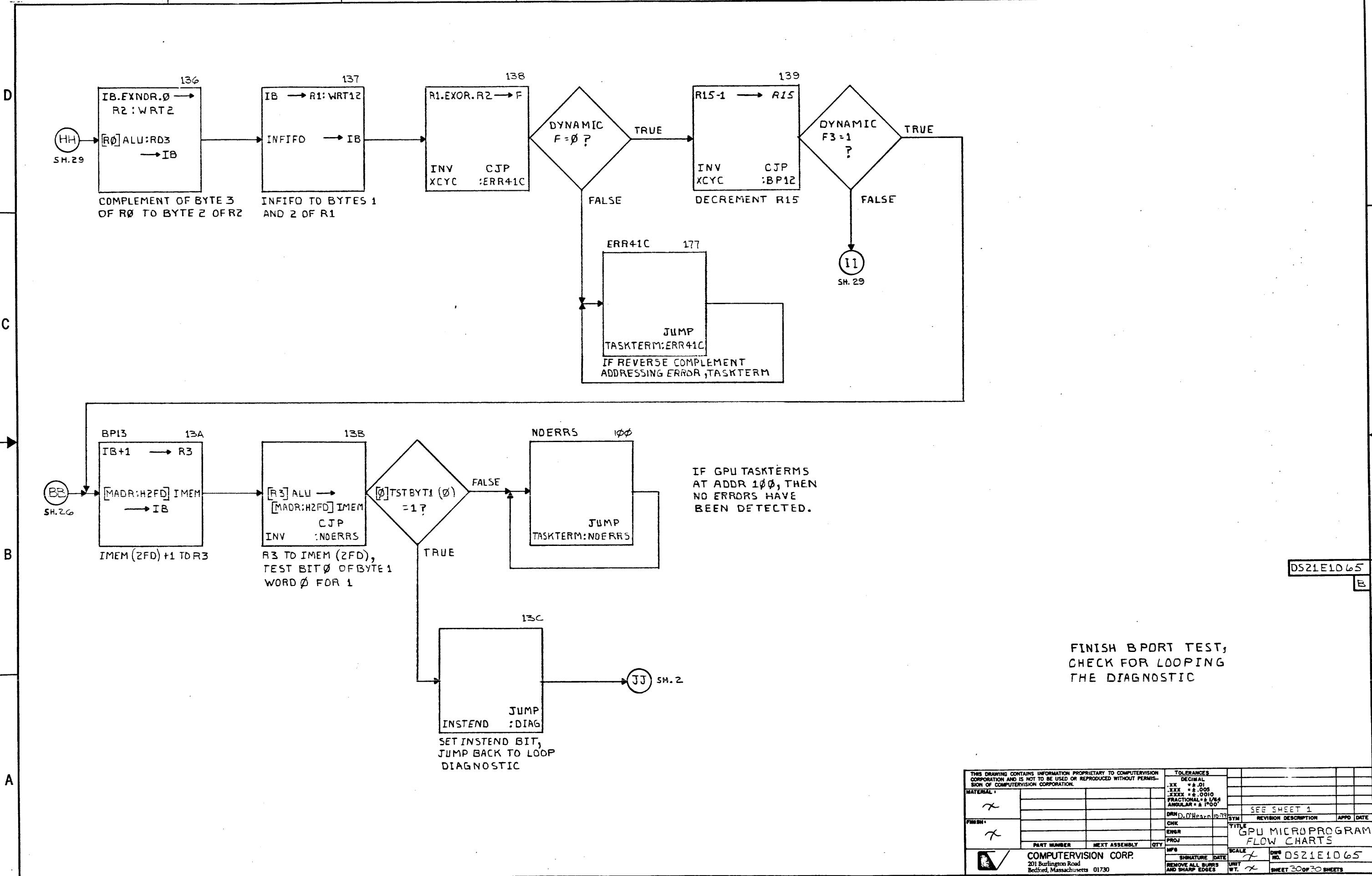


THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES	
MATERIAL:	DECIMAL	XX	0.01
	XXX	± .005	
	XXXX	± .0010	
	FRACTIONAL	± 1/64	ANGULAR
DRW D.O'Hearn 10-73		SEE SHEET 1	
FINISH:	CHK	SYM	REVISION DESCRIPTION
	ENGR	TITLE	GPU MICROPROGRAM FLOW CHARTS
	PROJ	QTY	
	MFG	UNIT	DS21E1065
PART NUMBER		SCALE	DATE
COMPUTEVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE	DATE
REMOVE ALL SHARP EDGES		SCALE	DS21E1065
AND SHARP EDGES		UNIT	WT.
SHEET 28 OF 20 SHEETS			

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



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\_\_\_\_\_

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\_\_\_\_\_

FROM:  
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NAME: \_\_\_\_\_ DATE \_\_\_\_\_

TITLE: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

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